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Research Week 2026

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February 9

Keynote Speaker

Confessing Our Past, Challenging Our Present, Contemplating Our Future: Our New Call to Action for Research

Quincy Byrdsong, EdD, MA, CCRP
Vice President, Research Operations & Institutional Official
Ballad Health

NH 437 – 12 pm
Zoom ID: 383 038 7820
PC: iTgDnP3z

Writing High-Impact Manuscripts

Matt Vassar, PhD
Director
Office of Medical Student Research

NH 437 – 1 pm
Zoom ID: 383 038 7820
PC: iTgDnP3z

Tuesday

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LabArchives 101:
The Basics of LabArchives ELN

Gloria Yandari, MS
Enterprise Success Manager
LabArchives, LLC - Better Science

NH 437 – 2 pm
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PC: iTgDnP3z

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Discover Funding Opportunities with Pivot-RP

Eddie Neuwrith
Sr. Director of Product Management
Clarivate

NH 437 – 12 pm

Microsoft Teams ID:
284 138 769 383 18

PC: pF6xo36x

Thursday **February 12**	**Student Research Panel:** Biomedical Sciences Graduate Student Association	NH 437 – 11 am Zoom ID: 383 038 7820 PC: iTgDnP3z
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Friday **February 13**	**Ethical Use of AI Tools for Health Science Research** Madison Hastings, MLS, HS Research Services Librarian OSU CHS Medical Library	NH 437 – 12 pm Zoom ID: 383 038 7820 PC: iTgDnP3z
	Poster Presentations Poster Session A: 1:00pm - 2:00pm Poster Session B: 2:30pm - 4:00pm	Tandy Conference Center 1 pm – 4 pm *Refreshments provided*
	Student Research of the Year Award Presentation: Dean, Cherokee Nation Campus Natasha Bray, PhD	Tandy Conference Center 2:00 pm
	Research Week 2025 Award Presentation: **Oral & Poster Excellence Awards** Assistant Clinical Professor of Medical Education Janel Johnson, DO, MPH, FACOFP	Tandy Conference Center 2:15 pm

OFFICE OF
RESEARCH
OSU Center for Health Sciences

Keynote Speaker

Confessing Our Past, Challenging Our Present, Contemplating Our Future: Our New Call to Action for Research

Quincy Byrdsong, EdD, MA, CCRP
Vice President, Research Operations & Institutional Official
Ballad Health

Dr. Quincy J. Byrdsong is the Vice President for Research Operations at Ballad Health in Johnson City, Tennessee. He earned his Bachelor and Master of Science Degrees in Biology from Middle Tennessee State University (MTSU), a Master of Arts in Biblical Exposition from Liberty University. and his Doctor of Education degree from Tennessee State University (TSU). In his current role, Dr. Byrdsong is charged with the development and implementation of Ballad's strategic research plan, Vision for Superior Discovery, oversees research directors, partners with regional academic institutions, leads all research administration and compliance functions of Ballad Health including the Institutional Review Board and Human Research Protection Program, Research Informatics, Medical Library, and collaborates regularly with Ballad Health executive leadership, Corporate Compliance, Legal, and Medical Affairs.

Dr. Byrdsong has served in several capacities in both the academic and healthcare system sectors with over twenty-three years of direct clinical research executive management experience at Meharry Medical College, Morehouse School of Medicine, Virginia Commonwealth University Medical Center and Wellstar Health System. Dr. Byrdsong is an avid public speaker and frequently speaks to audiences around the world on the topics of clinical trial administration, research ethics, and human research protections including the history of human experimentation in the U.S.

Dr. Byrdsong is a Certified Clinical Research Professional (CCRP) as well as past President of the Society of Clinical Research Associates (SOCRA) and past Board Member of the Association for the Accreditation of Human Research Protection Programs (AAHRPP).

LabArchives 101:
The Basics of LabArchives ELN

Gloria Yarandi

Enterprise Success Manager
LabArchives, LLC - Better Science

Gloria Yarandi is an Enterprise Success Manager at LabArchives and serves as the LabArchives representative for OSU-CHS. She holds both a Bachelor's in Neuroscience and a master's degree in Comparative Medicine and Integrative Biology with an emphasis in Neuroscience from Michigan State University. Drawing on her experience as a researcher and former LabArchives user, Gloria brings firsthand insight into how LabArchives supports secure data management and efficient research workflows.

Ethical Use of AI Tools for Health Science Research

Madison Hastings, MLIS, HS
Research Services Librarian
Oklahoma State University Center for Health Sciences Medical Library

Madison Hastings, MLIS is a Research Services Librarian at the OSU College of Osteopathic Medicine at the Cherokee Nation. She is an early-career librarian with an academic background in Library and Information Science and Health Studies from Texas Woman's University. Madison currently serves as co-chair of the SCC/MLA Early Career Librarians Initiative (ECLI) and is passionate about health sciences librarianship, ethical research practices, and improving health literacy among underserved communities. Her Research Week presentation focuses on the ethical use of AI tools in health science research.

Title: Evaluating Pulmonary Valve Transplantation Using a Swine Model: A Preclinical Platform for Pediatric Valve Growth Studies

Authors: *P Anderson; A Furrukh; H Javed; MA Zaghw; A Qasim; S Chung; R Henrich-Lobo; B Reemtsen; T Konrad Rajab*

Affiliations:

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2. Arkansas Children's Research Institute, Little Rock, AR, USA (AF, HJ, SC, TKR)
3. Department of Surgery, University of Arkansas for Medical Sciences, Little Rock, AR, USA (AF, HJ, BR, TKR)
4. Department of Biostatistics, University of Arkansas for Medical Sciences, Little Rock, AR, USA (SC)
5. Department of Pathology, University of Arkansas for Medical Sciences, Little Rock, AR, USA (RHL)

Abstract

Introduction/Objectives: Congenital heart defects affect approximately 1 in 100 live births worldwide, and many pediatric patients require valve replacement. Current prosthetic valve options lack growth potential, often necessitating multiple reoperations during childhood. Partial heart transplantation (PHT), which involves transplantation of a living valve-bearing cardiac segment, offers a potential growth-accommodating alternative. This study aimed to develop and evaluate a large-animal swine model of pulmonary valve PHT to assess surgical feasibility, immunosuppression strategies, graft performance, and early outcomes relevant to pediatric valve growth.

Methods: A pulmonary valve PHT swine model was established using 70 pigs (35 donors, 35 recipients). Donor pulmonary roots were harvested and implanted into the recipients' right ventricular outflow tract via median sternotomy. Standardized anesthesia, operative techniques, and postoperative care protocols were utilized. Immunosuppression regimens were adapted from established orthotopic heart transplantation protocols. Recipients were monitored for survival, somatic growth, valve function by echocardiography, and histologic evidence of rejection.

Results: All 35 transplant procedures were successfully completed, with a 91% survival rate beyond postoperative day seven. Among 32 surviving animals, 30 demonstrated preserved pulmonary valve function at six weeks, with only mild regurgitation or stenosis observed. No thromboembolic events, leaflet damage, graft failure, or structural complications occurred. Imaging and necropsy confirmed appropriate graft integration with the native right ventricular outflow tract.

Conclusions: This study demonstrates that pulmonary valve PHT is feasible and reproducible in a swine model. Early outcomes support its utility as a preclinical platform for studying biologic valve growth and immune adaptation, with important implications for future pediatric valve replacement strategies.

Title: Who got big, where and when? Evolution and ecology of giant carnivorous dinosaurs through the Jurassic and Cretaceous

Authors: *C Boisvert; J Perkins; C Morrison; SJL Gascoigne; TR Holtz; B Curtice*

Affiliations:

Oklahoma State University Center for Health Sciences, Tulsa, OK (CB, JP, CM, SG, TH, BC)

Abstract

The Jurassic and Cretaceous Periods of the Mesozoic Era saw the reign of different groups of two-legged megatheropod (>1000 kg) dinosaurian predators that dominated various ecosystems. These included the clades (evolutionary groups) Ceratosauria, Megalosauroidea, Allosauroidea, Megaraptora, and Tyrannosauroidea. While initially megalosauroids and allosauroids ruled much of the world as apex predators, a climatic event called the Cretaceous Thermal Maximum (=KTM, Cenomanian-Turonian Stages) shifted the balance, with these and other clades going extinct. At the close of the Turonian (~89.8 Ma), the surviving clades would evolve to fill vacated roles of apex predators. The macroecological predatory shift surrounding this event is a hotbed of active research.

Intriguingly, tyrannosaurs were the only megatheropods in their ecosystems, whereas earlier ecosystems appear more diverse. Exactly how did community structures change, and did the KTM play a role in the turnover? We tested for relationships between median size class for five megatheropod clades across six time bins (ranges) in the Jurassic and Cretaceous. We specifically tested if a shift of median size class for surviving clades occurred across the KTM. We split time bins by period boundaries or important climatic events. To each theropod species, we assigned a time value and bin, land mass, latitude, and longitude coordinates, paleocoordinates, estimated length and mass, size class from a published system, and type specimen. We conducted a non-parametric Kruskal-Wallis test on the size class data with Wilcoxon and Bonferroni post hoc tests in R. Statistical tests analyzed potential differences in median size classes between clades and differences for any specific clade pairs. We analyzed the number of adult size classes missing from ecosystems dominated by different apex predator clades with one-way ANOVA, Kruskal-Wallis, and connected post hoc tests. This was further analyzed to look at potential differences between ecosystems with differing apex predators. Ecosystem data results were cross-checked in PAST 4.15.

Median size class differed significantly between clades (Kruskal-Wallis p=1.392e-05) with four significant pairs: Ceratosauria-Megalosauroidea (median size class shift before the KTM), Ceratosauria-Allosauroidea (before KTM), Allosauroidea-Megaraptora (median size class shift across KTM), and Allosauroidea-Tyrannosauroidea (across KTM). Ecosystems data differed significantly in median number of missing size classes (p = 0.00231, one-way ANOVA; p = 0.006772, Kruskal-Wallis). Only the tyrannosauroid and allosauroid/megalosauroid environments exhibited significant differences in median number of missing size classes. Fewer predator size classes occurred in tyrannosauroid environments compared with allosauroid/megalosauroid environments. Results provide evidence for the timing of post-KTM predatory clade median size class shifts. Ceratosaurians did not increase median size class after the KTM, while tyrannosauroids and megaraptorans did increase in median size class. Potential mechanisms for why specific theropod clade pairs varied in median size class include size or morphologically differentiated niche occupation and habitat partitioning. Analysis of allosauroid/megalosauroid environments indicates more diverse predatory guilds (ecological units comprising species filling a similar role) before the KTM. Further analysis is needed regarding the mechanisms behind differing clade specific median size class shifts, and why tyrannosauroid environments display potentially lessened diversity.

Title: Occult Left-Sided Loculated Pleural Effusion in Chest Pain: Clinical Value of Lung Ultrasound Beyond Normal ECG and Chest X-Ray

Authors: *N Chauhan*

Affiliations:

Oklahoma State University Center for Health Sciences, Tulsa, OK

Abstract

Background: The role of lung ultrasonography is frequently underutilized in individuals presenting with chest pain when ECG and chest X-ray results are normal. Chest pain is a common reason for medical consultation, particularly in the elderly, and is addressed through a systematic, clinically guided diagnostic approach. Electrocardiography (ECG) is routinely conducted to quickly detect or rule out acute cardiac conditions, whereas chest X-ray is frequently used to assess pulmonary and pleural pathologies. In standard clinical practice, normal ECG and chest radiography frequently result in reassurance and symptomatic treatment. However, a chest X-ray exhibits limited sensitivity in identifying left sided loculated pleural effusions, especially when the collections are small, non-dependent, or situated in paracardiac or retrocardiac areas, where they may be obscured by the cardiac shadow, a condition that lung ultrasound can readily detect.

Case Presentation: A 70-year-old Indian male with a prolonged history of smoking appeared with left-sided chest pain. The initial assessment adhered to established clinical standards, encompassing vital signs, physical examination, electrocardiogram, chest radiography, and routine blood tests, all of which yielded normal results. Considering his age and cardiovascular risk profile, he was initiated on aspirin and statin medication and subsequently discharged. The patient returned within three days with ongoing pain and was treated symptomatically according to unchanged investigations. Two weeks later, he returned with persistent problems. The repeated ECG and chest X-ray, along with the 2D echocardiogram, were unremarkable. A point-of-care lung ultrasound was done that demonstrated a left-sided posterior paracardiac loculated pleural effusion, obscured by the cardiac shadow and not detectable on PA chest radiographs. Subsequent assessment confirmed a tubercular etiology, prompting the initiation of antitubercular therapy, which resulted in clinical improvement.

Discussion: This case illustrates a significant limitation of chest radiography in assessing chest pain due to pleural effusion and emphasizes the value of lung ultrasonography. Loculated pleural effusions may be radiographically hidden due to overlap with the cardiac silhouette and mediastinal structures. In contrast to free pleural effusions, loculated collections are non-dependent and frequently do not exhibit typical radiographic indicators such as meniscus development or posterior costophrenic angle blunting. Small to moderate effusions may consequently go undiagnosed, particularly when obscured by adjacent lung parenchyma, the diaphragm, and the cardiac apex. Although lateral chest X-rays enhance the identification of free pleural effusions, they do not consistently reveal loculated collections. Lung ultrasound exhibits great sensitivity, enabling the detection of low pleural fluid volumes, identification of septations and loculations, and visualization of effusions obscured by the heart or diaphragm. This case advocates for the integration of lung ultrasonography into standard clinical assessments for chest pain when initial cardiac and radiographic evaluations yield normal results thereby aiding in accurate diagnosis and enhancing healthcare outcomes.

Title: Osteohistology of Wild and Captive Black Bears (Ursus americanus) Reveals Life History and Regional Bone Remodeling

Authors: *AS Gohar; HN Woodward; HM Sallam*

Affiliations:

1. Department of Anatomy and Cell Biology, Oklahoma State University Center for Health Sciences, Tulsa, OK, USA (ASG, HNW)
2. Mansoura University Vertebrate Paleontology Center (MUVP), Mansoura University, Mansoura, Egypt (ASG, HMS)

Introduction/Objectives: Black bears (*Ursus americanus*) remain largely inactive during hibernation, yet do not experience the cortical bone loss typically associated with prolonged skeletal disuse in mammals. Previous osteohistological research has focused primarily on limb bones, leaving the skeletal response of axial elements, particularly ribs, poorly understood. This study examines intra-skeletal variation in bone microstructure between the femora and ribs of wild and captive black bears to investigate regional skeletal responses to hibernation, growth, and physiological stress.

Methods: Midshaft femora and ribs were histologically sampled from four individuals: three wild bears (two females, one male) and one captive female. Undecalcified thin sections were prepared following standard osteohistological protocols and examined under polarized light microscopy. Cortical growth tissue types, Lines of Arrested Growth (LAGs), remodeling intensity, and relative cortical area were documented for each element.

Results: Femora displayed a laminar-plexiform fibrolamellar complex with progressively increasing parallel-fibered bone toward the periosteal surface. Growth zones were consistently bounded by parallel-fibered bone preceding each LAG. The captive bear exhibited skeletal maturity, evidenced by an Outer Circumferential Layer following the seventh LAG. One wild individual showed unusually thick parallel-fibered bands, interpreted as a stress signal potentially associated with hibernation while affected by mange. Despite presumed lack of hibernation, the captive bear's femoral microstructure differed minimally from that of wild hibernators, apart from narrower parallel-fibered bands, suggesting conserved limb growth dynamics. Relative cortical area was higher in femora (mean 61.6%) than in ribs (mean 46.5%), reflecting greater mechanical loading demands in limb bones. Femoral remodeling was spatially concentrated around the linea aspera, whereas ribs in all adult individuals were extensively remodeled and osteoporotic. Only the subadult rib retained primary tissue, indicating age-linked remodeling progression and a likely role of ribs as dynamic calcium reservoirs during hibernation.

Conclusions: Black bears exhibit a region-specific skeletal strategy in which cortical maintenance is preserved in load-bearing limb bones, while axial elements undergo extensive remodeling consistent with calcium mobilization needs during hibernation. These findings highlight the capacity of bears to decouple mechanical disuse from cortical bone loss and underscore the functional significance of ribs in seasonal mineral homeostasis. This intra-skeletal variation provides new insight into mammalian bone plasticity under prolonged metabolic and behavioral constraints.

Keywords: Osteohistology; Hibernation; Cortical Remodeling; Life History; *Ursus americanus*

Title: **The Impact of Incarceration on Long-Term Health Outcomes in Minority Men**

Authors: *C Hattley*

Affiliation:

Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma (CH)

Abstract

Introduction/Objectives: This case review will identify long-term health outcomes of incarceration for minority men, explore health data regarding minority men's diagnosis, explore health data regarding minority incarceration health data, identify barriers to access to care for minority men post incarceration, and identify how incarceration impacts minority men's health.

Methods: An article review and literature review were conducted in hopes of identifying research themes regarding the impact of incarceration on long-term health outcomes in minority men.

Results: In 1978, the federal government restricted research on prison and jail inmates in medical studies; such regulations have had lasting impacts on the research provided regarding incarcerated individuals. Literature review identified the following themes: physical health impacts, mental health impacts, life expectancy impacts, and barriers to access to care.

Conclusions: Understanding the lasting health impacts on minority men's health post incarceration can positively shift the program offerings during incarceration, assist re-entry programs with research to aid in strategizing program offerings, and assist health organizations with addressing health disparities which directly impact individuals post incarceration. Incarceration has a direct negative correlation to the life expectancy of previously incarcerated minority men. Future research should be conducted to continue to understand current impacts as they may continue to shift as the topic is understood more and programming is put into practice to combat the proven health issues before they become concerns.

Keywords: minority health, male health, health disparities

Title: **Tracking Outcome Changes in Benign Prostatic Hyperplasia Trials: A Version History Review of ClinicalTrials.gov Records**

Authors: *T Livsey; M Itani; A Elghzali; R Hazlitt; K Keefer; R Sherry; D Archer; AI Ford; M Vassar*

Affiliations:

1. Office of Medical Student Research, Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma, United States (TS, MI, AE, RH, KK, RS, DA, AF, MV)
2. Department of Psychiatry and Behavioral Sciences, Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma, United States (AF, MV)

Abstract

Background: Benign prostatic hyperplasia (BPH) is a common condition with trials that frequently rely on subjective outcomes. While federal regulations require prospective outcome registration in ClinicalTrials.gov, modifications to these outcomes are permitted and often unjustified, potentially compromising transparency and interpretability. This study examined the frequency, timing, type, and transparency of prespecified outcome modifications in BPH trials.

Methods: We conducted a registry-based cross-sectional analysis of interventional BPH trials registered on ClinicalTrials.gov between January 18, 2017, and December 31, 2024. Eligible trials enrolled adult males, reported posted results, contained prespecified outcomes in both original and most recent registry versions, and were linked to peer-reviewed publications. Modifications were categorized by type (e.g., additions, removals, rewordings), timing, and severity. Key variables included the Outcome Load Index (OLI) and a Severity-Weighted Change Score. Statistical analyses included Cochran's Q tests, Kaplan-Meier survival analysis, and correlation tests.

Results: Of 1383 records screened, 36 trials met inclusion criteria. All trials (100%) exhibited at least one outcome modification, none of which were justified. Modifications occurred exclusively after primary completion; half occurred before publication and half after. Minor rewording and broad-to-specific definitional shifts were most common. Changes were significantly more frequent in secondary outcomes ($p < 0.01$). Severity scores varied widely but were not consistently associated with funder or intervention type. OLI showed weak correlation with modification frequency ($r = 0.17$).

Conclusions: In this registry-based analysis of BPH clinical trials, outcome modifications were universal, occurred exclusively after primary completion, and were never justified in either the registry or corresponding publications. These findings highlight a persistent gap in transparency that could affect the interpretability of trial results. Greater oversight of registry version histories and stronger disclosure standards are needed to ensure the credibility of outcome reporting in BPH research and beyond.

Title: Exploring Sex-Based Differences in Response to Chronic Colitis in Rats

Authors: *L Ostmo; S Das*

Affiliations:

Department of Biochemistry and Microbiology, Oklahoma State University Center for Health Sciences, Tulsa, OK (LO, SD)

Abstract

Introduction/Objectives: Inflammatory bowel disease (IBD) is a chronic dysregulated inflammatory disease affecting more than 3 million people in the United States. It is characterized by severe inflammatory responses and visceral abdominal pain, leading to compromised mucosal barrier integrity that further aggravates disease pathogenicity. Although the etiology of IBD remains unclear, genetic predisposition, environmental triggers, and gut microbiota are recognized contributors to disease development. In efforts to identify biomarkers for early detection and disease monitoring, prior work from our laboratory has identified novel candidates, including Glutaminase 1 (GLS1), an enzyme that converts glutamine to glutamate. Glutamine is essential for gut health, reduces inflammation, and helps maintain intestinal barrier integrity. In addition, inflammatory stress in IBD can trigger endoplasmic reticulum (ER) stress, where proteins fail to fold properly, activating the unfolded protein response (UPR). Our previous studies identified GLS1 as an important biomarker associated with the severity of acute colitis in rat models, and acute inflammation also increased expression of multiple UPR and differentiation markers. To further validate GLS1 as a biomarker in chronic colitis and to better understand sex-based differences in inflammatory outcomes, this project examined GLS1 expression and regulatory mechanisms in a chronic TNBS colitis rat model.

Methods: Male and female wild-type (WT) and GLS heterozygous (GLS+/−) Sprague-Dawley rats were intrarectally administered 2,4,6-trinitrobenzenesulfonic acid (TNBS) in 50% ethanol to induce colitis beginning at 8 weeks of age. Control animals received only 50% ethanol (in PBS). TNBS treatment was repeated once weekly for four weeks. A subset of rats received inhibitors during the final week of the study: azacitidine (Aza) to block DNA methylation, 6-diazo-5-oxo-L-norleucine (DON) to inhibit GLS1, or tauroursodeoxycholic acid (TUDCA) to inhibit ER stress/UPR signaling. Inhibitors were administered intrarectally in three doses across ~1.5 weeks. Rats were euthanized on experimental day 29; colons were collected and snap frozen in liquid nitrogen. DNA, RNA, and protein were extracted from colon tissue for molecular analyses.

Results: Severity of chronic inflammation was directly linked with GLS1 expression, at least in WT females. Treatment with Aza, DON, and TUDCA reduced GLS1 expression, suggesting GLS1 regulation occurs at epigenetic, pharmacologic, and UPR-linked levels. Chronic colitis also altered expression of UPR markers (e.g., Atf6) and differentiation markers (e.g., Cdx2). In GLS+/− animals, expression of these markers was largely abrogated, supporting a role for GLS1 in modulating inflammatory signaling as well as ER stress/UPR and differentiation pathways.

Conclusions: Increased GLS1 expression during chronic colitis further supports GLS1 as an inflammatory biomarker linked to inflammation severity. Blocking GLS1 expression via DNA methylation inhibition, direct pharmacologic inhibition, or modulation of ER stress/UPR significantly alleviated colon inflammation. The mild or near-absent inflammation observed in GLS+/− animals further supports the conclusion that reduced GLS1 expression limits disease severity. Additional studies are needed to define the mechanistic contribution of ER stress/UPR and epigenetic regulation in GLS1-driven chronic colitis.

Keywords: ulcerative colitis; glutaminase; inflammatory bowel disease

Title: Preliminary Evidence of Mast Cell-Mediated Immune Signatures in Post-COVID Recovery

Authors: *C Pierce; K McCracken; B Ford*

Affiliations:

Department of Pharmacology and Physiology, Oklahoma State University, Center for Health Sciences, Tulsa, OK, (CP, KM, BF)

Abstract

Objective: Post-acute symptoms following SARS-CoV-2 infection are frequently reported. However, the biological pathways contributing to these persistent issues remain poorly understood. Recent data suggests that mast cell activation (MCA) may contribute to Long-COVID symptoms, overlapping with features of Mast Cell Activation Syndrome (MCAS). This pilot study investigated whether MCA biomarkers are elevated in women recently recovered from COVID-19 (rCOV) and whether early MCA and psychosocial factors predict persistent or worsening post-COVID symptoms.

Method: Nineteen women (mean age = 41.6, ± 11.7) were enrolled either 3-4 weeks after self-confirmed SARS-CoV-2 infection (rCOV; n = 12) or as healthy controls with no recent infection (HC; n = 7). At baseline, participants completed questionnaires and provided serum for ELISA-based quantification of mast cell mediators (histamine, leukotriene C4 (LTC4), prostaglandin D2 (PGD2), tryptase, chymase) and pro-inflammatory cytokines (interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α)). Three months later, participants reported ongoing or worsening symptoms via remote follow-up survey. Group differences were tested using Wilcoxon rank-sum tests, and within-group symptom associations were assessed using Welch's t-tests.

Results: rCOV participants showed elevated histamine (p =.001) and LTC4 (p =.038) compared to healthy controls (HC), with no significant group differences for other mediators. Within the rCOV group, higher baseline histamine was associated with breathing difficulty (p =.002) and cough (p =.008) at follow-up. Elevated baseline TNF-α predicted worsening GI symptoms (p =.0004) at follow-up, while histamine was elevated in those with worsened brain fog (p = 0.032) and fatigue (p =.052). Exploratory tests also revealed that higher baseline BMI predicted presence of breathing difficulty (p =.0005) and cough (p =.0023) at follow-up and the worsening of brain fog (p =.001), cough (p =.037), fatigue (p =.022), and GI problems (p =.0004) – while higher ACEs scores were linked to worsening brain fog (p =.036) and cough (p =.049).

Conclusions: These findings support the hypothesis that MCA biomarkers, particularly histamine, LTC4, and TNF-α signaling, persist in the early recovery phase and contribute to respiratory and multisystem symptoms. BMI and psychosocial factors may further influence symptom trajectories. Larger, longitudinal studies are needed to validate MCA biomarkers as predictors of post-COVID risk and to clarify the role of stress, BMI, and early life adversity in development of ongoing symptoms post-COVID.

Keywords: Long-COVID; mast cell activation; post-COVID symptoms; women's health; immune biomarkers

Title: Exploring Nasal-derived *Staphylococcus aureus* Extracellular Vesicles: Isolation, Characterization, and Their Impact on Upper Respiratory Tract Epithelium.

Authors: *BK Raju; V Gujar*

Affiliations:

Oklahoma State University Center for Health Sciences, Tulsa, OK (BR, VG)

Abstract

Background: Chronic Rhinosinusitis (CRS) is a type 2 inflammatory disease that is persistent for more than 12 weeks. CRS affects more than 12% of the global population worldwide. CRS is a multifactorial disease influenced by genetic, environmental, and nasal microbial factors. In general, CRS patients are usually presented with two or more cardinal symptoms for the physician to diagnose, such as nasal airway obstruction, facial or periorbital pain or pressure, mucopurulent drainage, and decreased sense of smell. The relationship between chronic rhinosinusitis (CRS) and its resident microbiota in the nasal system has been the subject of extensive research over the years. Microbiome research on CRS has shown that microbial dysbiosis is present in the nasal microbiomes. Staphylococcus aureus is a major resident of the human skin and nose and is an opportunistic pathobiont. Infections caused by S. aureus vary from mild to severe and are potentially fatal, especially when they enter the bloodstream and cause sepsis, pneumonia in the lungs, endocarditis in the heart valves, and osteomyelitis in the bone. Recent studies indicate that *S. aureus* produces extracellular vesicles (EVs), also known as membrane vesicles (MVs), that play roles in cellular communication, the transport of virulence factors, and the regulation of the host immune response. The influence of these MVs on physicochemical and functional characteristics of the upper respiratory epithelium is largely unexplored.

Methods: Nasal-derived *S. aureus* was cultured with brain-heart infusion broth overnight in a shaking incubator at 37°C at 250 rpm. The extracellular vesicles were extracted from the media by concentrating using Amicon filters (100 kDa) and further processed through IZON columns, with the resulting fractions being collected. These EVs were then characterized using Spectradyne's nanoparticle analyzers, transmission electron microscopy (TEM), and Western blot. After the characterization, the extracted EVs were treated on the air-liquid interface (ALI)-grown respiratory epithelial cells (10 µg of EV protein concentration). The cells were harvested, and RNA was extracted, fixed for sc-RNA seq to understand the mechanistic role of the EVs.

Result: Our preliminary analysis showed that the isolated EVs' size falls in the 70-100 nm range, which is confirmed through Spectradyne and TEM, and the western blot validated that these EVs are LTA positive. The single-cell RNA differential gene expression analysis revealed a significant change in cellular heterogeneity.

Conclusion: This study provides the first general picture of isolation and characterization of nasal-derived *S. aureus* EVs. To understand how these EVs play a role in host-bacterial communication, RNA and protein sequencing will be performed in our future studies to explore host-microbe communication.

Keywords: Extracellular vesicles, Host-pathogen interaction, Upper Respiratory Tract infection.

Title: The role of micronutrient supplementation on improving *Clostridioides difficile* vaccine efficacy in elderly mice.

Authors: *J Rivet-Tissot; J McCreary; Y Liu; C Davitt; V McCalister-Jones; I Huang*

Affiliations:

1. *Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma (JR, JM, YL, IH)*
2. *Oklahoma State University College of Osteopathic Medicine, Tulsa, Oklahoma (CD, VM)*

Abstract

Immunosenescence in elderly individuals leads to a weaker immune system, which affects vaccine response. In the case of *Clostridioides difficile* infection, elderly people are at higher risk because they spend more time in hospitals and nursing homes, where spores are shed. Additionally, their weakened immune system often necessitates antibiotic therapy, further increasing their risk of infection.

Current treatment for *C. difficile* primarily relies on antibiotics such as vancomycin and metronidazole. Although these antibiotics are effective, they do not prevent recurrent infections. Some *C. difficile* strains are also highly antibiotic-resistant, highlighting the need for alternative treatments. Fecal microbiota transplantation is one such alternative currently being studied, along with vaccination. However, since elderly individuals are more susceptible to infection, it is crucial to consider immunosenescence in vaccine research and identify strategies to enhance their immune response for successful immunization against *C. difficile*.

In this study, we aim to identify supplements that can improve *C. difficile* vaccine efficacy in 18-month-old mice. In the first phase, we compared the immune response to the *C. difficile* recombinant toxin B (rTcdB) vaccine between young (6-week-old) and elderly (18-month-old) mice. The mice (n = 16) were given a control diet *ad libitum* and vaccinated intraperitoneally with 20 μg/ml rTcdB + Alum three times at one-week intervals, while control mice received only Alum + PBS. Serum samples were collected via submandibular bleeding one day before vaccination, and IgG levels were analyzed using ELISA.

In the second phase of the experiment, elderly mice (n = 36) will be divided into three dietary groups: regular diet (n = 12), vitamin-rich diet (n = 12), and mineral-rich diet (n = 12). Each dietary group will be further subdivided into vaccinated (n = 6) and non-vaccinated (n = 6) groups. The vaccinated mice will receive the same immunization protocol as in the first phase. Following euthanasia, spleen and fecal samples were collected for IgG analysis using ELISA.

Results indicate that elderly mice exhibit a lower immune response to the vaccine compared to younger mice, with significantly lower IgG levels at 1000× serum dilution ($P = 0.0020$). We are currently working on assessing the role micronutrient supplementation in enhancing humoral immunity in our mice model, although we are not seeing a significant IgG level difference between the control, mineral, or vitamin groups.

Aged mice exhibit significantly reduced humoral responses to the rTcdB vaccine compared to young mice, highlighting the impact of immunosenescence on vaccine efficacy. Micronutrient supplementation did not significantly enhance IgG responses, indicating that additional strategies may be required to improve *C. difficile* vaccine effectiveness in elderly populations.

Title: Framing Harms: A Qualitative Thematic Analysis of Rhetorical Strategies in Adverse Event Reporting for Benign Prostatic Hyperplasia Clinical Trials

Authors: *R Sherry; T Livsey; M Itani; L Corwin; D Archer; R Hazlitt; K Keefer; AI Ford; M Vassar*

Affiliations:

1. *Office of Medical Student Research, Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma (RS, TV, MI, LC, DA, RH, KK, AF, MV)*
2. *Department of Psychiatry and Behavioral Sciences, Oklahoma State University Center for Health Sciences, Tulsa, Oklahoma (AF, MV)*

Abstract

Objective: To qualitatively characterize how published BPH trial reports frame, minimize, justify, or contextualize adverse events.

Methods: We conducted an inductive, grounded theory–guided thematic analysis of AE reporting in peer-reviewed BPH clinical trials. Relevant AE excerpts were extracted and coded iteratively through open and axial coding to generate higher-order categories. Final codes were synthesized into overarching themes representing dominant rhetorical strategies. Reflexive discussion and consensus were maintained throughout, and Entman's framing theory was used to interpret communicative function.

Results: Six major themes emerged: (1) Minimization of Harm Magnitude or Impact, (2) Justification through Absence and Prior Evidence, (3) Comparative or Equivalence Framing, (4) Normalization and Contextualization, (5) Denial or Deflection of Responsibility, and (6) Omission or Obscuration of AE Details. The most prevalent were Minimization of Harm Magnitude or Impact (n=36) and Justification through Absence and Prior Evidence (n=23), reflecting a pervasive tendency to reassure readers by downplaying AE relevance or emphasizing their absence. Themes frequently co-occurred, underscoring the complexity of harm framing in BPH research.

Conclusions: AE reporting in BPH trials often employs rhetorical strategies that minimize or reframe harms. These findings reveal communicative patterns overlooked by quantitative assessments, emphasizing the need for transparency, standardization, and reflexive awareness in reporting adverse events within urologic research.

Title: Optimizing Emergency Department CT Imaging: The Role of Point-of-Care Creatinine Testing in Safe Contrast Utilization

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Abstract

Introduction/Objective: Computed tomography (CT) imaging is a cornerstone of emergency department (ED) diagnostics, enabling rapid evaluation of life-threatening conditions such as trauma, acute abdominal pathology, stroke, and pulmonary embolism. While contrast-enhanced CT improves diagnostic accuracy, it carries potential risks, most notably contrast-induced nephropathy (CIN), particularly in patients with underlying renal impairment. Timely assessment of renal function is therefore critical in balancing diagnostic benefit with patient safety. This study examined the utility of contrast-enhanced CT imaging in conjunction with point-of-care (POC) iStat creatinine testing in the ED, with emphasis on clinical decision-making, patient safety, workflow efficiency, and cost-benefit considerations.

Methods: A narrative review of the literature was conducted evaluating the role of CT imaging in emergency medicine, the pathophysiology and risk factors associated with CIN, and the accuracy and operational advantages of iStat creatinine testing compared with traditional laboratory measurements. Cost-benefit considerations and alternative imaging strategies were also assessed.

Results: CT imaging remains indispensable for rapid diagnosis and triage in the ED, significantly reducing time to intervention and improving clinical outcomes. Contrast enhancement increases diagnostic sensitivity for vascular, inflammatory, and neoplastic processes but introduces nephrotoxic risk in vulnerable populations. Evidence demonstrates that iStat creatinine testing provides rapid, reliable assessment of renal function with strong correlation to standard laboratory testing, enabling timely and individualized imaging decisions. Integration of POC creatinine testing facilitates appropriate selection of contrast versus non-contrast imaging, supports implementation of renal protective strategies, and reduces unnecessary delays and potential complications.

Conclusion: The combined use of contrast-enhanced CT imaging and POC iStat creatinine testing offers a patient-centered, efficient approach to ED diagnostics. By enabling rapid renal function assessment, clinicians can optimize imaging strategies, minimize the risk of CIN, and improve resource utilization. As emergency departments face increasing patient volume and acuity, integrating POC technologies with advanced imaging protocols represents a critical strategy for enhancing safety, efficiency, and clinical outcomes.

Keywords: Point-of-Care Testing**,** Contrast-Enhanced Computed Tomography**,** Emergency Department Diagnostics

Title: **Autism and the impact of SDOH on the receipt of ABA Therapy**

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Abstract

Introduction/Objectives: Applied behavior analysis (ABA) is an evidence-based treatment for children diagnosed with autism spectrum disorder; however, access to and continuity of ABA services may be disrupted by social determinants of health (SDOH). This study aimed to measure the prevalence of ABA receipt among children with autism and to evaluate the likelihood that SDOH including socioeconomic status, education, and unmet health care needs are associated with non-receipt of ABA therapy.

Methods: we conducted a cross-sectional study of the National Survey Children's Health to assess rates of ABA receipt among children with autism, and the potential impact of SDOH in receiving this service. We used logistic regression models to assess associations of SDOH on ABA treatment receipt.

Results: Our sample included 4055 respondents representing more than 2.6 million children in the US with autism. Among these children, our results showed that 2364 (56.2%) had received behavioral treatment in the past 12 months. Children not receiving ABA were significantly more likely to unmet healthcare needs—including medical, mental health, vision, hearing, or dental (OR: 1.46; 95%CI: 1.00-2.12, P = .048). Additionally, we found receipt of ABA treatment was significantly associated with higher income and education, in addition to not having unmet healthcare needs (P<.05).

Conclusions: In this nationally representative sample of children with autism, just over half received ABA therapy in the prior year, with receipt significantly associated with higher household income, higher parental education, and the absence of unmet health care needs. These findings highlight the role of SDOH in shaping access to evidence-based behavioral interventions and suggest that children who lack access to ABA may be at increased risk for downstream social, developmental, and mental health challenges. Efforts to reduce socioeconomic and health care related barriers to ABA access may help promote more equitable service delivery and improve outcomes for broader pediatric populations with developmental disabilities.

Title: Adverse Event Reporting in Urology Clinical Trials: Inconsistencies Between Trial Registries and Publications of Adverse Events and the Impact of MedDRA

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Abstract

Introductions/Objectives: Misrepresentation and underreporting of adverse events (AEs) threaten the validity, transparency, and safety of clinical research, with substantial downstream clinical and economic consequences. Although standardized terminologies such as the Medical Dictionary for Regulatory Activities (MedDRA) were developed to improve consistency in harm reporting, their real-world impact on reporting quality in urology clinical trials remains poorly defined. This study aimed to evaluate the completeness and consistency of AE reporting in urology clinical trials and to determine whether MedDRA use is associated with improved harms-reporting quality.

Methods: We conducted a secondary analysis of a previously curated dataset of interventional urology clinical trials registered on ClinicalTrials.gov with corresponding peer-reviewed publications. Harms reporting was assessed using three prespecified metrics: an eight-item Completeness Score, a seven-domain Registry–Publication Concordance Score, and a composite Harms Transparency Index (range, 0–15). Concordance was evaluated across key AE domains, including serious adverse event (SAE) counts, other adverse event (OAE) counts, AE-related discontinuations, mortality, and reporting thresholds. Trials were categorized based on MedDRA use in the registry, publication, both, or neither. Descriptive statistics and nonparametric comparisons were used to assess associations, and multivariable logistic regression was performed to identify predictors of MedDRA adoption.

Results: Seventy-two urology clinical trials met inclusion criteria, of which 47.2% referenced MedDRA in at least one reporting source. Registry–publication discordance was common across all AE domains, exceeding 70% for SAE event counts, OAE event counts, and OAE reporting thresholds, and remaining substantial for mortality and AE-related discontinuations. Overall harm reporting completeness in publications was moderate, whereas registry–publication concordance was consistently poor. Use of MedDRA was not associated with improved completeness, concordance, or overall transparency, with similar Harms Transparency Index scores observed among MedDRA-using and non–MedDRA-using trials. No trial-level characteristics were significantly associated with MedDRA adoption.

Conclusion: Adverse event reporting in urology clinical trials is frequently incomplete and highly discordant between trial registries and published reports. Despite regulatory endorsement, MedDRA use alone does not meaningfully improve harm-reporting completeness, consistency, or transparency. These findings suggest that standardized terminology, in isolation, is insufficient to address persistent deficiencies in adverse event reporting and underscore the need for structured, field-specific harm-reporting frameworks to support reliable safety assessment in urologic research.

Title: Original Research: A Survey of Practicing Nurses in Clinical and Academic Settings: Interests, Experience, and Attitudes Toward Research Conduct

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Abstract

Background: Nursing research education is woven throughout nursing curricula, and nurses acknowledge that nursing research is key to improved outcomes, quality, and safety in nursing. Research shows declines in publications by nurse researchers and in enrollment in Ph. D.-prepared nursing programs, though the reasons for these declines remain unclear.

Purpose: The purpose of this study is to describe differences in the levels of interest, experience, confidence, and attitude toward conducting research between RNs who work in clinical settings and those who work in academic settings.

Methods: The study design used a quantitative cross-sectional comparative analysis with a one-way analysis of covariance (ANCOVA).

Results: A total of 283 nurses were surveyed across eight domains of assessment; each domain achieved a Cronbach's alpha score of 94 or higher. RNs noted that research is confusing and challenging, resulting in decreased interest and engagement in research conduct.

Conclusion: Understanding RNs' interests, experience, confidence, and attitudes toward conducting research provides insight into the development of a core curriculum for nursing research education.

Title: **Three-Dimensional Modeling of Hepatic Vasculature Using Contrast-Enhanced CT in Cirrhotic and Non-Cirrhotic Livers**

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Abstract

Introduction/Objectives: Cirrhosis affects not only hepatic parenchymal function but also intrahepatic vascular architecture. Structural vascular alterations, including angiogenesis and capillarization, contribute to increased intrahepatic resistance and play a central role in the development of portal hypertension by introducing narrower vessels with decreased compliance and lessened response to vasodilation. Our goal was to model and qualitatively compare intrahepatic vascular architecture in cirrhotic and non-cirrhotic livers using contrast-enhanced CT-based three-dimensional reconstruction.

Methods: Contrast-enhanced abdominal CT scans from two patients, one with established cirrhosis and one without known liver disease were analyzed. Each liver was reconstructed in 3D from individual CT slices using Avizo software, followed by isolation of intrahepatic vascular structures. Three-dimensional reconstructions of the hepatic vasculature were generated. Vascular caliber, distribution, and relative vessel number were assessed qualitatively and compared between cirrhotic and non-cirrhotic models.

Results: Contrast-enhanced CT enabled three-dimensional visualization of intrahepatic vasculature in both cirrhotic and non-cirrhotic livers. The non-cirrhotic liver demonstrated relatively uniform vascular distribution across hepatic lobes with preservation of larger-caliber vessels. In contrast, the cirrhotic liver exhibited diverse vascular patterns, with regions of absent of vasculature and areas with dense networks of small-caliber, capillarized vessels, limiting visualization of larger vessels.

Conclusions: Contrast-enhanced CT-based three-dimensional modeling enables qualitative visualization of intrahepatic vascular architecture in cirrhotic and non-cirrhotic livers. This approach may provide a foundation for future studies investigating vascular remodeling in cirrhosis and its relationship to portal hypertension progression or therapeutic response to angiogenesis-targeting interventions.

Keywords: cirrhosis, portal hypertension, CT modelling

Title: Perioperative Hypersensitivity to a Vaginal Cuff Hemostatic Agent in the Setting of Alpha-Gal Syndrome

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Abstract

Background: Alpha-gal syndrome (AGS) is an increasingly recognized IgE-mediated hypersensitivity reaction to mammalian products that can lead to serious surgical implications if not considered intraoperatively. As hemostatic agents are frequently utilized during gynecologic surgery, it is important to recognize the components of these agents and potential adverse effects. Delayed hypersensitivity reactions to animal-derived surgical materials remain an area with minimal research. This case report aims to highlight the importance of appropriate hemostatic agent selection in patients with sensitivities, particularly those with AGS.

Case Presentation: In this case report, we follow the perioperative course of a 42-year-old woman with known AGS who underwent an elective hysterectomy for a history of abnormal uterine bleeding. Intraoperatively, a bovine-derived hemostatic agent was applied to the vaginal cuff. The patient's perioperative course was complicated by a delayed presentation of complications including pelvic hematoma, abscess formation, dehiscence and necrosis requiring three additional surgeries. Unlike the expected postoperative course, this patient's course was notable for persistent eosinophilia without the presence of leukocytosis despite having pelvic abscesses.

Discussion: It is suspected that the patient experienced a delayed-hypersensitivity reaction superimposed on a secondary infection associated with exposure to the hemostatic agent used intraoperatively. This patient's case is consistent with an inflammatory process related to exposure of mammalian products in a patient with known AGS.

This case highlights the potential severity, adverse outcomes, protracted hospital course, and utilization of resources that may be associated with patients with AGS being exposed to animal-derived surgical materials. Specifically, this case demonstrates that hypersensitivity reactions may be delayed and not immediately recognized. Surgeons should maintain heightened vigilance when operating on patients with known AGS and explore alternative hemostatic agents to prevent unnecessary adverse outcomes.

Keywords: Alpha-gal syndrome; Delayed hypersensitivity; Hemostatic agents; Gynecologic surgery; Case report

Title: MedDRA Use and Transparency of Adverse Event Reporting in HIV Clinical Trials

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Abstract

Introduction: Inconsistent reporting of adverse events between clinical trial registries and peer-reviewed publications may undermine accurate safety assessment. Standardized adverse event terminology, such as the Medical Dictionary for Regulatory Activities (MedDRA), is intended to improve harms reporting, but its association with the completeness, registry-publication concordance, and overall transparency of reporting remains uncertain.

Methods: We conducted a cross-sectional analysis of 130 interventional clinical trials with publicly available registry and publication data. Trials were classified by MedDRA use in the registry, publication, both, or neither, and grouped as any MedDRA use versus no MedDRA use. Registry–publication discordance was evaluated across adverse event domains, including serious adverse events (SAEs), other adverse events (OAEs), treatment discontinuation due to adverse events, mortality, and OAE reporting thresholds. Harms reporting quality was assessed using completeness (0–8), concordance (0–7), and a composite Transparency Index (0–15). Univariable logistic regression examined predictors of MedDRA use.

Results: Among 130 trials, 83 (63.8%) used MedDRA in at least one reporting source, while 47 (36.2%) did not. Registry–publication discordance was common across all adverse event domains. Discordance in SAE participant counts occurred in 68.7% of trials with MedDRA use and 82.6% without MedDRA use; discordance in SAE event counts occurred in 85.5% and 87.2%, respectively. OAE-related discordance was nearly universal, with discordant OAE event counts in 100.0% of MedDRA-using trials and 97.3% of non-MedDRA trials. Trials using MedDRA demonstrated higher median completeness scores (6.0 vs 3.0), concordance scores (1.0 vs 0.0), and Transparency Index scores (7.0 vs 3.0) compared with trials not using MedDRA. Phase 4 trials had lower odds of MedDRA use compared with phase 2 trials (OR, 0.11; 95% CI, 0.02–0.44).

Conclusion: Registry–publication discordance in adverse event reporting is widespread. While MedDRA use is associated with improved harms reporting quality, substantial inconsistencies persist, indicating that standardized terminology alone may be insufficient to ensure transparent safety reporting.

Keywords: MedDRA, HIV/AIDS, Transparency

Title: Metabolic profiling of health-associated gut microbes with translational implications for obesity

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Abstract

Introduction/Objectives: Adult obesity rates have doubled since 1990 worldwide, equating to approximately 1 in 8 people in 2022.[4] This prevalence is concerning, considering obesity is the leading cause of type 2 diabetes.[1] The bacterial family *Christensenellaceae* (within the Firmicutes phylum, class Clostridia, order Clostridiales) has emerged as an important member of the human gut microbiome, with studies establishing a correlation between elevated levels of *Christensenella* and a lower body mass index (BMI), fewer incidences of cardiovascular disease, and overall healthy glucose metabolism.[3] The *Christensenellaceae* family habitually form co-occurrence networks within the microbiome, often associated with gut methanogens such as *Methanobrevibacter smithii*, presumably due to *Christensenella's* production of H_2 linked to direct consumption by methanogenic archaea.[2] This microbial consortium is enriched in individuals with low metabolic BMI, forming a strong association to metabolic health, inferentially due to lipid-mediated effects.[1] I aim to understand the current biochemical basis of *Christensenella* spp. and *Methanobrevibacter smithii* interactions by comprehensively profiling each species using API and Biolog systems and completing co-culturing experiments to determine whether syntrophic interactions augment the metabolic potential of the microbial community.

Methods: Four *Christensenella* spp. were anaerobically cultivated on pre-reduced Gifu Anaerobic Media (GAM) agar plates incubated at 37° C. Cells were harvested on day five and assayed via BioMérieux API methodology. Specifically, API ZYM, API Rapid ID 32A, API 20A, and API 50CH were compiled in order to cover full biochemical activity. Assays were performed according to manufacturer's instructions with deviations to account for anaerobic conditions. Co-culturing experiments were performed utilizing GAM agar and broth to observe how *Christensenella* spp. behaved in concert, prior to the experimental incorporation of archaea.

Results/Conclusions: All four *Christensenella* species (*C. minuta, C. tenuis, C. intestinihominis,* and *C. hongkongenesis)* were successfully cultivated and assayed using API kits. Results from each assay were compiled and compared to published literature, highlighting where newly generated data fill information gaps. Profiling the metabolic activities of *Christensenella* revealed biochemical features that could enable interspecies interactions in the gut, offering a framework for investigating their potential impact on host metabolism. Future directives include simulation of metabolite-sharing conditions with *M. smithii* to determine the ways in which syntrophy augments the metabolic capacity of co-cultures. The interspecies metabolic interactions with *M.* smithii are anticipated to expand the functional repertoire of *Christensenella* spp. with such mechanisms holding the potential for translational therapeutic probiotics targeted at reducing the climbing rates of obesity through improved host metabolic health.

Title: Framing Harms: A Qualitative Thematic Analysis of Adverse Event Reporting in Total Knee Arthroplasty Clinical Trials

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Abstract

Background: Transparent adverse event (AE) reporting in total knee arthroplasty (TKA) randomized controlled trials (RCTs) is essential for informed decision-making. Beyond omission, the narrative "framing" of safety data can shape how risk is perceived. This study qualitatively analyzed AE reporting in TKA RCTs to identify discursive strategies used to frame harms.

Methods: AE reporting sections from TKA RCTs (2009–2024) were analyzed using constructivist grounded theory with iterative open and axial coding to inductively develop themes. ChatGPT-4 was used as a collaborative tool in initial code generation, which was manually refined. The research team used embedded reflexivity to mitigate bias. Emergent themes were interpreted using Entman's (1993) four framing functions: problem definition, causal attribution, moral evaluation, and treatment recommendation.

Results: Seven framing strategies emerged: (1) Absolute Assertions of Safety, categorical language denying harms; (2) Temporal and Methodological Ambiguity, unclear monitoring timelines or methods; (3) Scope Restriction and Selective Focus, narrowing AE visibility through structure or emphasis; (4) Minimization and Justification of Harm, downplaying severity or shifting causality; (5) Statistical Framing of Risk, using insignificance to dismiss harms; (6) Clarity and Transparency Enhancers, a counter-theme of strong reporting; and (7) Obscuring AE Magnitude, omitting key data such as frequency or denominators.

Conclusion: AE reporting in TKA RCTs often employs sophisticated narrative framing that minimizes perceived risk and reinforces safety. These strategies, consistent with Entman's framing functions, construct a selective version of safety that may misrepresent total harm data, undermining evidence integrity and the foundation of informed consent.

Keywords: Total knee arthroplasty, adverse events, qualitative research, framing theory, harms reporting, research transparency

Title: The Hidden Crisis in Surgical Evidence: How Unstandardized Adverse Event Reporting Undermines Clinical Decision-Making

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Abstract

Background: Adverse event (AE) reporting transparency is essential for evidence-based surgical practice, yet substantial reporting gaps persist despite CONSORT Harms guidance. The Medical Dictionary for Regulatory Activities (MedDRA) provides standardized terminology for AE classification, but its association with AE reporting quality remains unexplored.

Methods: This cross-sectional study analyzed gastrointestinal and abdominal surgical randomized controlled trials (RCTs) registered on ClinicalTrials.gov with results posted between September 2009 and December 2024, aligning with implementation of the FDAAA Final Rule timelines. Trials were assessed for explicit MedDRA documentation in their registry and peer-reviewed publication. Harms Reporting Completeness scores (0-8, based on CONSORT Harms elements), Concordance scores (0-7, measuring registry-publication agreement), and combined Harms Transparency Index scores (0-15, totaling scores of completeness and concordance) were calculated, with higher scores indicating superior AE reporting quality. Univariable logistic regression identified predictors of MedDRA adoption while Wilcoxon rank-sum tests compared reporting quality between MedDRA-documenting and non-documenting trials.

Results: Among 117 included trials, only 22 (18.8%) explicitly documented MedDRA use. Industry-funded trials (OR=29.66, 95% CI=9.05-119.85, $p<0.001$) and those with at least one U.S. site (OR=4.59, 95% CI=1.22-30.02, $p=0.050$) demonstrated significantly higher rates of MedDRA adoption. Trials documenting MedDRA use demonstrated significantly improved reporting across all three score parameters: Completeness score ($p<0.001$), Concordance score ($p=0.002$), and Transparency Index ($p<0.001$). Serious adverse event registry-publication discordance was 59.1% in MedDRA documenting trials and 85.1% in non-MedDRA trials.

Conclusion: Despite strong association with improved AE reporting completeness and registry-publication concordance, MedDRA adoption in gastrointestinal and abdominal surgical trials remains below 20%, concentrated among industry-funded studies. The predominance of unstandardized terminology and free-text strategies promotes reporting inadequacies that complicate evidence synthesis and undermine evidence-based surgical practice. Journals, funding agencies, academic institutions, and researchers should prioritize the adoption of standardized AE terminology to enhance transparency and improve surgical research.

Keywords: Adverse Events, MedDRA, Surgery, ClinicalTrials.gov

Title: The Effect of Chronic Oxycodone Exposure on IP-10 & IL-6 Production in C20 Human Microglia

Authors: *A Carter; A Jones; J Chakka; RL Davis*

Affiliations:

Oklahoma State University Center for Health Sciences, Tulsa, OK (AC, AJ, JC, RD)

Abstract

Introduction/Objectives: Microglia are glial cells that support and protect the neurons of the central nervous system (CNS) in various ways. One of their major functions is to help promote the inflammatory response when a threat is detected. When activated by cytokines such as tumor necrosis factor-alpha (TNFα) or interferon-gamma (IFNy), they produce cytokines/chemokines such as interleukin-6 (IL-6) and interferon gamma inducible protein-10 (CXCL10). Previous studies have shown that inflammatory activation of microglia can eventually lead to chronic pain. Oxycodone (OXY) is an opioid commonly prescribed to help relieve pain, but its effects on microglia are not fully known. In general, opioids are considered immune suppressive, but there is evidence that some opioids such as oxycodone can cause microglial activation. More research needs to be done to determine the possible effects chronic opioid treatment has on inflammation and chronic pain. Our research focuses on how chronic oxycodone exposure affects the inflammatory response in human microglia (C20 cells).

Methods: In our *in vitro* experiments, the C20 cells were cultured for three days in complete medium. Afterwards, the cells were cultured in serum-free medium (SFM) or SFM containing OXY (30 ng/ml). After 24 hours, the SFM was exchanged again and the cells were either unstimulated (control) or treated with OXY (30 ng/ml), TNFα (50 ng/ml), IFNy (50 ng/ml), OXY+TNFα, or OXY+IFNy. Following another 24-hour period, cell viability was assessed using an MTT assay and both CXCL10 and IL-6 levels in the media were measured using enzyme-linked-Immunosorbent-assays (ELISA's).

Results: Preliminary data has shown that C20 cells express a significantly higher amount of IL-6 when treated with TNFα alone as compared to control cells and cells treated with OXY+TNFα. The data has also shown that the C20 cells express a higher amount of CXCL10 when treated with either TNFα alone or with OXY+IFNy as compared to control cells and OXY+TNFα cells and control cells and cells treated with IFNy alone, respectively, but the results are not significant.

Conclusions: Further experimentation of oxycodone's effects on inflammatory signaling in C20 microglia needs to be done and is in progress. We expect to further our understanding of the impact of oxycodone on microglia and potentially enhance clinical treatment strategies.

Keywords: opioids, inflammation, microglia, cytokines

Title: Cannabidiol inhibits Interferon-γ-induced inflammatory signaling in C20 human microglial cells

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Abstract

Background: Inflammatory signaling and cytokine expression in microglia is disrupted in psychiatric disorders, neurodegenerative diseases, pain, and trauma. In brain cancer, the tumor microenvironment, which is critical for tumor growth and metastasis, also includes these neuroinflammatory cytokines. Therefore, there is increasing interest in pharmacologically targeting microglia to treat neurological conditions. Cannabidiol (CBD) reportedly has anti-inflammatory effects, but mechanistically, there remains much to learn about the specific effects in microglia—particularly, in human microglia. In this in vitro study, we aimed to determine whether the anti-inflammatory effects of CBD extend to C20 human microglia.

Methods: Microglia (in 24-well plates) were stimulated with interferon-γ (IFN) in the presence/absence of cannabidiol (CBD) for 24 h. Cell viability was assessed via a 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) reduction assay. Chemokine (C-X-C motif chemokine ligand 10, CXCL10, and C-C motif chemokine 2, CCL2) expression was determined by measuring levels in the media using enzyme-linked immunosorbent assays (ELISAs). Data were analyzed using a Kruskal-Wallis test, followed by pairwise comparisons using a Wilcoxon test (significance was set at $P < 0.05$).

Results: Our findings indicated that CBD (≥ 5 µM) inhibited IFN-induced CXCL10 expression, whereas induced CCL2 expression was inhibited by 0.1 µM CBD, but not at higher concentrations. Cell viability was not significantly affected by any treatment conditions.

Conclusions: This initial study provides evidence that CBD, at non-cytotoxic concentrations, inhibits the expression of IFN-induced CXCL10 and CCL2 in C20 human microglia. Further investigation is required to fully understand the effects of CBD on inflammatory signaling in microglia and define the mechanism of action. Ultimately, this line of investigation is expected to advance the therapeutic potential of CBD and related compounds.

Keywords: cannabidiol, microglia, neuroinflammation

Title: Xylazine adulteration of heroin triggers neuroimmune modulation

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Abstract

Introduction: Substance use disorder (SUD) is increasingly characterized by polysubstance use, with xylazine frequently co-administered alongside heroin. While opioid exposure is known to alter immune function, the neuroimmune mechanisms underlying heroin-xylazine interactions remain poorly understood. Microglia, the resident immune cells of the central nervous system, play a central role in neuroinflammation and have been implicated in SUD related inflammatory responses.

Methods: To investigate the effects of heroin, xylazine and their combination on microglial inflammatory signaling both in vitro and in vivo models were employed. SIM-A9 murine microglial cells were treated with heroin (0.5 mM), xylazine (10 μM), or a combined treatment for 6 hours. Pro-inflammatory and immune-modulatory gene expressions including IL-6, TNF-α, IL-1β, CXCR2, CX3CR1, and IL-4 were quantified by quantitative PCR, with cytokine protein levels assessed by ELISA in SIM-A9 cell lysates. Microglial inflammatory activation state was examined using inducible nitric oxide synthase (iNOS) and arginase-1 (Arg1), assessed by immunocytochemistry and Western blotting. NF-κB signaling was evaluated by quantifying p65 nuclear translocation. For in vivo, adult male Sprague-Dawley rats underwent self-administration of heroin, xylazine and their combination followed by abstinence and cue-induced reinstatement. Microglial activation in the medial prefrontal cortex (mPFC) was assessed using IBA1 immunohistochemistry.

Results: In SIM-A9 microglial cells, heroin and xylazine exposure significantly increased pro-inflammatory cytokine gene expression, with the combination treatment producing the most robust transcriptional response. ELISA analysis of SIM-A9 cell lysates supported increased cytokine production in vitro. Microglial activation was further evidenced by a significant increase in iNOS expression indicating a shift toward a pro-inflammatory microglial state. Enhanced NF-κB p65 nuclear localization confirmed activation of inflammatory signaling pathways. In vivo, drug self-administration was associated with increased IBA1 immunoreactivity in the medial prefrontal cortex, suggesting persistent microglial activation in this brain region.

Conclusion: These findings demonstrate that heroin and xylazine directly activate microglial inflammatory signaling through NF-κB–dependent pathways, promoting a pro-inflammatory microglial phenotype in vitro and persistent microglial activation in the medial prefrontal cortex in vivo. This work identifies microglia as a key neuroimmune mediator of polysubstance opioid exposure and highlights neuroinflammation as a potential contributor to relapse vulnerability.

Keywords: Microglia; Neuroinflammation; Heroin, Xylazine

Title: Chronic Escalating-Dose Oxycodone Induces Sex-Specific Modulation of the Gut Microbiome in C57BL/6 Mice

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Oklahoma State University Center for Health Sciences, Tulsa, OK (AC, LL, DV)

Abstract

Introduction/Objectives: Opioid use has been consistently associated with gut microbial dysbiosis, which may influence the gut–brain axis, contributing to behavioral, neuroimmune, and metabolic alterations. While chronic opioid exposure induces changes in microbial community structure, the role of biological sex in shaping these responses is not well understood. Sex differences in hormonal profiles, immune function, and gastrointestinal physiology can substantially influence microbial ecology, yet few studies have systematically examined sex-dependent microbiome responses to opioids. Here, we investigated the effects of chronic escalating-dose oxycodone on gut microbiome composition in male and female C57BL/6 mice to determine whether opioid-induced dysbiosis exhibits sex specificity.

Methods: Wild-type C57BL/6 mice were housed in groups of up to three per cage under standard laboratory conditions (12-hour light/dark cycle, 22 ± 1 °C, 50% humidity) with ad libitum access to chow and water. All procedures were approved by the Institutional Animal Care and Use Committee and conducted in accordance with NIH guidelines. Mice (n = 260) were randomly assigned to receive intraperitoneal injections of either sterile saline (0.9%) or escalating doses of oxycodone twice daily over eight experimental days. The oxycodone regimen consisted of 9.0 mg/kg on postnatal days (PND) 66–67, 17.8 mg/kg on PND 68–69, 23.7 mg/kg on PND 73–74, and 33 mg/kg on PND 75–76. Behavioral assessments were conducted using an open-field arena on the final day, although the primary focus of this study was on microbiome composition.

Fecal samples were collected daily under sterile conditions and stored at −80 °C. Genomic DNA was extracted using the ZymoBIOMICS™ DNA Microprep Kit with mechanical bead beating for 20 minutes, followed by purification and storage at −20 °C. 16S rRNA sequencing targeting the V3-V4 region was performed on the Illumina nextSeq 2000 platform. Sequence data were processed with QIIME2 (v2025.7), including quality filtering, denoising, and amplicon sequence variant (ASV) assignment at 97% sequence similarity. Downstream analyses included alpha and beta diversity metrics, taxonomic classification, and differential abundance testing. Beta diversity was analyzed using Bray–Curtis dissimilarity and unweighted UniFrac distances, with PERMANOVA to determine statistical significance between groups.

Results: Bray–Curtis beta diversity analyses revealed that chronic oxycodone administration significantly altered microbial community composition compared to saline controls (pseudo-F = 16.57, p = 0.001; q = 0.001). Similarly, unweighted UniFrac analysis demonstrated phylogenetic turnover with significant separation between oxycodone- and saline-treated groups (pseudo-F = 6.87, p = 0.001; q = 0.001), indicating changes in the presence or absence of specific microbial lineages. These results suggest that prolonged opioid exposure induces substantial dysbiosis, characterized by both the loss of native taxa and the emergence of previously undetectable lineages.

Importantly, microbial community structure differed significantly between sexes. Females and males

exhibited distinct microbial profiles as measured by both Bray–Curtis (pseudo-F= 26.61, p = 0.001; q = 0.001) and unweighted UniFrac (pseudo-F = 21.18, p = 0.001; q = 0.001). These differences indicate that sex is a major determinant of microbial community membership, beyond the effects of chronic oxycodone exposure. Taxonomic analyses revealed that female mice harbored higher relative abundance of Lactobacillaceae and Bacteroidota taxa, whereas males exhibited enrichment of Firmicutes lineages, consistent with prior reports of sex-dependent microbial signatures.

Conclusions: Chronic oxycodone administration induces robust gut microbial dysbiosis, with clear sex-specific signatures. These alterations provide a mechanistic link between opioid exposure and potential downstream behavioral and neuroimmune consequences. Future studies will explore whether these sex-dependent microbial changes contribute causally to behavioral phenotypes associated with opioid dependence and withdrawal.

Keywords: gut-microbiome, BDNF, opioids

Title: Patient Education on Non-Opioid Pain Management in Primary Care: A Quality Improvement Project

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Introduction/Objectives: Chronic pain is frequently managed with opioid therapy despite known risks and limitations. Patient education may play an important role in increasing awareness of non-opioid pain management strategies and supporting patient-centered decision making. This quality improvement (QI) project aimed to assess whether brief education on non-opioid approaches increased patient awareness of and interest in alternatives to opioid-based pain management.

Methods: This project was conducted during a four-week family medicine clinical rotation at Park Clinic Family Care in Duncan, Oklahoma in fall 2025. Adult patients with chronic pain who reported regular opioid use were included. During routine clinic visits, patients received brief education on non-opioid and multimodal pain management approaches. A voluntary, anonymous paper survey was administered immediately following the educational intervention to assess pain manageability, awareness of alternatives, perceived control over pain, interest in non-opioid approaches, and intentions related to opioid reduction. Data were analyzed using descriptive statistics.

Results: Eight patients who indicated regular use of opioids for pain management completed the survey. Most respondents reported pain levels that were manageable (63%) or somewhat manageable (25%). Following the educational intervention, all respondents reported increased awareness of alternative pain management options (63% yes; 38% somewhat). Most participants reported feeling at least somewhat more in control of managing their pain (75%), while one reported increased confidence in managing pain without opioids. Nearly 40% reported increased interest in trying alternative pain management approaches, and 25% expressed interest in reducing opioid use. Of six respondents who answered the question regarding intentions to discuss opioid reduction with their clinician, one expressed interest.

Conclusions: Brief patient education may increase awareness of and interest in non-opioid pain management strategies among patients with chronic pain. These findings support the role of patient-centered education in promoting shared decision making and multimodal pain management in primary care settings.

Keywords: chronic pain, opioids, quality improvement

Title: Reporting of Outcome Changes in Cardiac Arrhythmia Trials: A Cross-Sectional Analysis of ClinicalTrials.gov and Publications

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Abstract

Introduction/Objectives: Outcome modifications in clinical trials undermine transparency and interpretability. Despite the Food and Drug Administration Amendments Act Final Rule mandating prospective outcome registration, the extent and disclosure of outcome changes in cardiac arrhythmia (CA) trials remain unexamined. The objectives of the study are to characterize the frequency, nature, timing, and transparency of prespecified outcome modifications in interventional cardiac arrhythmia (CA) trials and assess the adequacy of disclosure in registries and publications.

Methods: We conducted a cross-sectional analysis of 70 interventional CA trials registered on ClinicalTrials.gov between January 18, 2017, and December 31, 2024. We assessed modification frequency, timing, type, and disclosure transparency in both registries and publications. Novel metrics including the Outcome Load Index (OLI) and Severity-Weighted Change Score were developed to characterize modification burden.

Results: All 70 trials (70/70; 100%) demonstrated at least one outcome change; the median was two revisions per trial. Most modifications (46/70; 65.7%) occurred after publication. Transparency was minimal: no registry records reported changes (0%), and only one publication disclosed modifications (1.4%). A strong correlation was observed between OLI and total modifications ($r=0.73$, $p<0.001$).

Conclusions: Outcome modifications in CA trials are universal yet systematically undisclosed, representing a fundamental gap in regulatory requirements. Despite existing policies, the absence of disclosure suggests insufficient enforcement and necessitates a multi-level intervention: mandatory modification logging in registries, journal verification of registry compliance, and institutional oversight during grant review.

Keywords: Cardiac Arrhythmia, Transparency, Evidence-Based Medicine, ClinicalTrials.gov

Title: Estradiol and Related Receptor Agonists Modulate HSD17 beta -13 Expression in Hepatoma cells and Hepatitis C virus -Related Cirrhosis and Hepatocellular Carcinoma

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Abstract

Introduction/Objectives:
Hepatitis C virus (HCV) is a global health concern and remains a leading cause of liver cirrhosis and hepatocellular carcinoma (HCC). Chronic HCV-infections progress more rapidly to liver cancer in males compared to females. We have recently reported that changes in estrogen receptor beta (ERβ) and tumor necrosis factor-alpha (TNF-α) expression are associated with worsening disease and may be a sex-dependent factor in HCC pathogenesis. Further, our proteomics studies of the HCV-cirrhosis and HCV-related HCC liver tissues of both the sexes showed significantly high expression of HSD17β13 (17β- hydroxysteroid dehydrogenase 13) in post-menopausal females. Human HSD17β13 gene is also linked to alcoholic and nonalcoholic fatty liver diseases with effects on liver injury, inflammation, fibrosis, cirrhosis, and HCC. Elucidation of estrogen mediated regulation of this key genetic modifier may reveal a new therapeutic target for treatment of HCV -related pathogenesis.

Methods: We investigated the role of Estrogen and Estrogen Receptors in the regulation HSD17β13 and TNF-α expression using in vitro Human hepatoma model, by subjecting to estrogen receptor modifying drug treatments. Relative messenger RNA (mRNA) expression was quantified in response to the treatments using qPCR. We obtained liver tissue samples of controls, HCV- cirrhosis, and HCV- related HCC from the NIH Liver Tissue Bank. Immunohistochemistry (IHC) along with image analysis of HSD17β13 was performed on the procured human liver tissues. RNA was isolated from 40 representative human liver tissue samples to perform mRNA analysis of HSD17β13 and high-throughput RNA sequencing (Illumina, NovaSeq 6000 system).

Results: Estrogen Receptor (ER) agonists 17β-estradiol (E2) and PPT induced dose dependent downregulation of HSD17β13 expression and ERβ agonist DPN inhibited only at higher doses. However, ER antagonist ICI alone significantly reversed these effects but the combination treatment of E2 and ICI restored it by downregulating HSD17β13. In contrast, both DPN and PPT showed a dose dependent increase in TNF-α expression. IHC image analysis showed significantly higher expression of HSD17β13 in control post-menopausal females compared to control pre-menopausal females and control males. Furthermore, both pre- and post-menopausal females and males with HCV -cirrhosis showed higher expression of HSD17β13 compared to the post-menopausal females and males with HCV -related HCC.

Conclusions: We demonstrate a protective role of nuclear ERs in modulating HSD17β13 regulation in human hepatoma Huh-7 cells. These findings have clinical implications and suggest ERs and downstream signaling pathways as potential therapeutic targets. HSD17β13 may serve as a novel sex-based biomarkers for early detection and prognosis of HCV-related liver pathogenesis. Studies will be performed using human liver tissue to validate HSD17β13 gene expression. NGS-RNA sequencing analysis will be performed to understand the transcriptomic profile of HSD17β13 in HCV -cirrhosis and HCV-related HCC.

Title: A Comparative Study of Generalized Anxiety Disorder-7 Scores and Cannabis Use in Addiction Medicine Patients and the General Population

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Abstract

Introduction/Objectives: In the US, nearly 50% of patients with a substance use disorder have co-occurring generalized anxiety disorder (GAD). The shifting landscape of cannabis legality in the United States may complicate this relationship. Cannabis is frequently used in recovery, a term coined "California Sober," in many communities. Indeed many individuals report using cannabis to manage anxiety symptoms, despite evidence that cannabis with higher THC is an anxiogenic substance and that anxiety is a withdrawal symptom of cannabis. Additionally, the impact of cannabis use on anxiety may differ between patient populations. To address this gap, this study seeks to compare the correlation of GAD and cannabis use between patients undergoing treatment for a substance use disorder and patients from a general clinical population.

Methods: We conducted secondary analysis from two OSU Clinical Registries: Project CANARY (Clinical and Neurobiological Augers of Recovery), a registry of adults actively enrolled in treatment for a substance use disorder at the OSU Addiction Medicine Clinic and the Imaging Registry of adults referred by their physicians for clinical MRIs at the OSU Biomedical Imaging Center. Data was collected through self-report surveys, including demographic information, General Anxiety Disorder-7 (GAD-7), and cannabis use. Electronic, self-reported Timeline Follow Back (TLFB) was used to assess cannabis use, patients reported on the prior 7-days from the completion of the TLFB, with instructions to complete within 72-hours of their study enrollment. Analyses are limited to just those patients who reported cannabis use on the TLFB from each registry and had GAD-7 score at study enrollment.

Results: The rate of cannabis use in the 7-day TLFB window was similar between the 2 populations, 21% cannabis use in Project CANARY (n=127) and 25% cannabis use in the Imaging Registry (n=80). The average cannabis use days was 3.78 days in CANARY and 4.2 days in Imaging Registry. The average anxiety scores were in the mild range for the Imaging Registry, 8.25 and the moderate range for CANARY 10.04, consistent with previous literature. The current samples do demographically differ, with an average age of 42.55, 15% male, 75% white in the Imaging Registry and an average age of 37.18, 52% male, 59% white in Project CANARY. Further analysis (Fisher r-to-z transformations) will examine whether there is a difference in the relationship between GAD and cannabis use in these 2 clinical populations.

Conclusions: The relationship between GAD and cannabis use is not well scientifically understood. The commercial cannabis markets frequently recommend use to address health concerns such as anxiety, pain and sleep; all of which frequently plague both Addiction Medicine patients as well as patients with health conditions requiring the need for an MRI. Our analysis aims to better understand how a relationship between two different clinical populations can help add clarity to the complex relationship between anxiety and cannabis use.

Keywords: GAD-7, anxiety, addiction, cannabis

Title: Evaluating Response Consistency Across Clinical AI Tools: A Dual-Metric Methodological Approach

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Abstract

Background: As artificial intelligence (AI) tools become increasingly integrated into clinical decision support, understanding the consistency of their outputs is essential for safe implementation. However, no standardized methodology exists for evaluating response stability across different AI architectures. We developed and piloted a dual-metric framework to assess AI response consistency for clinical queries.

Methods: Ten evidence-based clinical questions spanning common general surgery topics (small bowel obstruction, perforated ulcer, cholecystitis, appendicitis, postoperative fever, VTE prophylaxis, anastomotic leak, anticoagulation management, thyroid nodules, and inguinal hernia) were submitted to three AI tools: ChatGPT (GPT-5, free version), OpenEvidence, and DynaMedex. Five independent replicates were generated for each question-tool combination under standardized conditions. Response consistency was evaluated using two complementary metrics: semantic similarity (sentence-transformers/all-mpnet-base-v2 embedding model) to assess meaning preservation, and Jaccard index to assess lexical overlap.

Results: A total of 145 response pairs were analyzed. The three tools demonstrated markedly different consistency profiles. ChatGPT showed high semantic similarity (0.865 ± 0.054) but low lexical overlap (0.157 ± 0.053), indicating substantial textual variation while preserving clinical meaning. OpenEvidence demonstrated high semantic similarity (0.956 ± 0.018) with moderate lexical overlap (0.678 ± 0.172). DynaMedex showed high consistency on both metrics (semantic: 0.938 ± 0.081; Jaccard: 0.947 ± 0.110), reflecting near-verbatim response reproduction. The correlation between semantic and lexical similarity varied substantially by tool, suggesting fundamentally different underlying architectures (generative vs. retrieval-based).

Conclusions: A single similarity metric is insufficient to characterize AI response consistency across different clinical tools. Semantic similarity alone may overestimate stability in generative models, while lexical metrics alone may underestimate clinically meaningful consistency. We propose that evaluation frameworks for clinical AI should incorporate both semantic and lexical measures to accurately capture response behavior across architectures. This dual-metric approach provides methodological groundwork for future studies examining temporal stability and clinical reliability of AI-generated medical information.

Keywords: Artificial-Intelligence, Point-of-Care Database, Surgery

Title: Assessment of Online Patient Education Resources Recommended by ChatGPT and Google Gemini in Response to Diabetes FAQs

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Abstract

Introduction/Objectives: Patients increasingly use large language models (LLMs) to obtain health information, often relying on AI-recommended external websites for additional guidance. Diabetes mellitus is a common chronic condition that requires ongoing self-management, making the quality and accessibility of online educational resources particularly important. However, the characteristics of diabetes-related resources recommended by LLMs have not been well described. To compare the transparency, quality, understandability, actionability, and readability of online health information resources recommended by ChatGPT and Google Gemini in response to frequently asked questions about diabetes.

Methods: This cross-sectional content analysis evaluated 40 FAQ-URL pairs generated by ChatGPT and Google Gemini using standardized diabetes-related prompts. Recommended websites were assessed for transparency using the JAMA Benchmark Criteria, information quality using the Brief DISCERN instrument, and understandability and actionability using the Patient Education Materials Assessment Tool (PEMAT-P). Readability was assessed using Flesch-Kincaid Grade Level and Flesch Reading Ease metrics. Questions and website sources were categorized using Rothwell's classification system. Descriptive statistics and nonparametric tests were used for analysis.

Results: FAQs generated by both models primarily addressed Fact- and Policy- based questions, with ChatGPT producing a higher proportion of policy-related content and Gemini emphasizing factual queries. Government websites were the most commonly recommended source (n = 19), followed by academic (n = 13), commercial (n = 7), and social media (n = 1). Websites recommended by ChatGPT showed significantly greater transparency than those recommended by Gemini (mean JAMA scores 3.10 vs. 1.70), with higher rates of attribution and currency. Understandability was high for both models (ChatGPT: 86.8%; Gemini: 70.8%), whereas actionability remained limited (ChatGPT: 17.5%; Gemini: 10.0%). Readability exceeded recommended levels for patient materials and was more accessible than resources reported for other conditions.

Conclusion: Online health information resources recommended by LLMs for diabetes FAQs demonstrate high transparency and understandability, particularly when sourced from government and academic organizations. However, actionability remains limited, and readability still exceeds recommended levels for patient education. ChatGPT-recommended resources consistently outperformed Gemini-recommended resources on transparency. Clinicians should be aware of these platform-specific differences when counseling patients who use AI tools to seek diabetes information.

Keywords: Large language models, Online health information, Diabetes mellitus, Transparency

Title: The Effectiveness of Virtual Reality Rehabilitation Following Total Knee Arthroplasty: A Critically Appraised Topic

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Abstract

Introduction/Objectives: Virtual reality (VR) based rehabilitation has emerged as a potential adjunct or alternative to traditional physiotherapy following total knee arthroplasty (TKA). With over 700,000 knee replacements performed annually in the United States, optimizing postoperative recovery is crucial to improving pain management, improving mobility, and promoting overall function. The objective of this Critically Appraised Topic (CAT) was to evaluate whether VR-based rehabilitation leads to superior functional recovery and pain outcomes compared with traditional rehabilitation methods among adults aged 35-85 undergoing TKA.

Methods: A search of PubMed, Embase, ScienceDirect, and MDPI was conducted in October 2025. Search limits included randomized controlled trials (RCTs), English-language full-text publications from 2015 to 2025, participant ages 35-85, and studies comparing VR-based rehabilitation to traditional methods such as physiotherapy, home exercise programs, or continuous passive motion devices. Four RCTs met the inclusion criteria. Methodological quality was assessed independently by two reviewers using the PEDro scale.

Results: The search yielded 188 total studies, of which 4 RCTs met the inclusion and exclusion criteria. Two studies demonstrated statistically significant improvements in pain and functional range of motion for patients receiving VR-based rehabilitation, with notable changes in VAS, NPRS, and knee flexion ROM values at early postoperative time points. Two additional studies reported no significant difference in pain or function between VR and traditional rehabilitation. PEDro scores across studies ranged from 7/11 to 9/11, indicating moderate to high methodological quality. Variability in VR protocols, session frequency, and comparison interventions contributed to inconsistencies in outcome findings.

Conclusions: Low to Moderate evidence suggests that VR-based rehabilitation following TKA yields outcomes comparable to, and in some cases superior to, traditional rehabilitation methods for pain reduction and functional recovery. Although two RCTs demonstrated significant benefit, inconsistent findings across trials result in an overall Grade B recommendation. VR may serve as a valuable adjunct to improve patient engagement and reduce kinesiophobia; however, standardized VR protocols and long-term outcomes remain inadequately studied. Further research is warranted to establish protocol consistency, evaluate cost-effectiveness, and investigate functional outcomes beyond six months post-intervention.

Keywords: Virtual reality, rehabilitation, total knee arthroplasty, postoperative recovery, pain, functional outcomes

Title: Emotional eating linking social determinants of health and cardiovascular risk among adults with obesity

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Abstract

Purpose: Obesity affects more than 42% of the United States population contributing to cardiovascular diseases (CVD). Similarly, social determinants of health (SDOH), depression, and food security, excessive consumption of ultraprocessed foods and physical inactivity can further increase risk of CVD due to higher adiposity deposits and body mass index (BMI). Thus, it is important to assess the interdependent relationships between SDOH and CVD risk using a structural equation model (SEM) framework to evaluate BMI, depression, and food security linking SDOH to CVD risk among adults with obesity.

Methods: We performed a cross-sectional analysis using the National Health and Nutrition Examination Survey (NHANES) 2017-2023 datasets. Males and females above 18 years old were included. SDOH measures included household income, educational attainment, insurance and access to medical care. Variables included BMI, Major Depressive Disorder (MDD) assessed by the Patient Health Questionnaire Depression Screener (DPQ), and food security assessed by the Food Security Survey Module (FSSM). Analysis was limited to patients with obese-ranged BMI (≥ 30).

Results: The theorized model of disease progression is illustrated below, hypothesized relationships between SDOH, BMI, depression, food security and CVD indication. Results from the proposed analysis are forthcoming.

Conclusions: Our theorized model indicated significant relationships among social determinants of health and cardiovascular risk. Due to increasing SDOH and social inequities in the United States, it is important to address baseline deficiencies in SDOH by exploring public health interventions and policy reform to improve CVD risk.

Keyword: obesity, social determinants, emotional eating

Title: **Exploratory Microarray Analysis of Estrogen-Mediated Stress Pathways**

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Abstract

Introduction: Declining estrogen during menopause is associated with increased depression and anxiety, both stress-related disorders. In specific brain regions, estrogen is known to increase the expression of enzymes and receptors involved in the production and action of serotonin. In addition, estrogen affects the hypothalamic-pituitary-adrenal (HPA) axis associated with the stress response. This study examined the effect of estradiol benzoate (EB) on related gene expression in the paraventricular nucleus (PVN). Specifically, tryptophan hydroxylase (TPH), dopa decarboxylase (DD), serotonin receptors 5-HT1A and 5-HT2A, and corticotropin-releasing hormone (CRH).

Methods: Adult female Sprague-Dawley rats (n = 6) underwent ovariectomy and received either EB (10 µg, n=3) or oil vehicle (n=3) for two consecutive days. Forty-eight hours after the second injection, when behavioral and physiological effects of EB are at maximum, rats were euthanized. PVN brain punches were extracted, and mRNA was isolated and sent to Thermo Fisher for microarray analysis. Analysis was performed using Transcriptome Analysis Console software.

Results: EB significantly downregulated the expression of 5-HT2A. Non-significant trends included downregulation of TPH, DD, and 5-HT1A. CRH expression was increased in EB-treated rats by 3.6-fold, but results were not significantly different.

Conclusions: The goal of the study was to examine EB effects on gene expression in pathways associated with anxiety and depression. Overall, our results did not reflect findings from previous studies. Several factors may explain these findings: region-specific regulation by EB, downregulation of genes due to supraphysiological EB dosage, and sampling at a single time point that may reflect feedback inhibition instead of upregulation. Future studies should include a larger sample size, multiple time points, and additional brain regions.

Keywords: estradiol benzoate, estrogen, paraventricular nucleus, stress, serotonin, depression, HPA axis, gene expression

Title: Evaluation of Safety Reporting in Clinical Trials of Chronic Kidney Diseases: A Registry-Publication Comparison Study

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Abstract

Background: Accurate reporting of adverse events (AEs) is essential for guiding treatment decisions in chronic kidney disease (CKD), a population highly susceptible to treatment-related harms. However, the consistency of harms reporting between clinical trial registries and corresponding peer-reviewed publications warrants further evaluation in nephrology. This study aimed to assess the transparency of AE reporting for CKD trials by conducting a comparison between ClinicalTrials.gov and the matched publications.

Methods: We conducted a registry-to-publication comparison of interventional CKD trials with results posted on ClinicalTrials.gov (2009–2024) and matched U.S.-based publications. Data were extracted in duplicate. Descriptive statistics, regression models, and qualitative thematic analysis were used to evaluate reporting patterns. The protocol was preregistered on PROSPERO and OSF.

Results: Among 142 matched trials, most were industry-funded and initiated before the FDAAA Final Rule. Serious and other AEs were reported more frequently in ClinicalTrials.gov than in publications (e.g., post-Final Rule Serious Adverse Event reporting: 51% vs. 13%, $p < .001$). Serious AE count mismatches occurred in 89% of studies, typically with underreporting in publications. Funnel and Bland-Altman plots revealed substantial variability, particularly in smaller trials. Reporting quality did not improve significantly after the Final Rule. Overall, registry data were more comprehensive, uncovering persistent reporting discrepancies.

Conclusions: AE reporting in CKD trials remains inconsistent, with frequent underreporting in publications despite regulatory requirements. These gaps risk undermining evidence-based care for a high-risk population. Greater enforcement and integration of registry data are essential for enhancing transparency and guiding safer clinical decisions.

Keywords: Chronic kidney disease, Safety reporting, Clinical trials, Transparency, Adverse events

Title: Barriers to healthcare access among Black individuals with a history of melanoma: an analysis of the 2023 BRFSS

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Abstract

Background: Black patients continue to face numerous barriers in accessing healthcare, including transportation difficulties, financial strain, and perceived discrimination. Although melanoma is less common in the Black population, Black patients are more likely to present with a more progressive disease and poorer survival outcomes. Furthermore, there has been limited research exploring barriers to care among Black individuals with a history of melanoma. The objective of this study was to identify social determinants of health (SDOH) associated with healthcare access, as well as assess adherence to American Institute for Cancer Research's (AICR) cancer prevention guidelines within this population.

Methods: We conducted a cross-sectional analysis using the 2023-2024 data from the Behavioral Risk Factor Surveillance System (BRFSS). Individuals were included if they were identified as Black or African American and reported a diagnosis of melanoma. SDOH assessed were transportation barriers, financial strain, perceived discrimination, delayed medical care, and lack of a primary care provider, and AICR cancer prevention items included alcohol consumption, body mass index (BMI), smoking history, consumption of sugar-sweetened beverages, and engagement in physical activity. We used design-based X^2 tests to assess associations between SDOH and AICR components by sociodemographic factors.

Results: Our final sample included 4,451 individuals representing approximately 1.47 million U.S. residents. The majority were over age 50, predominantly female (55.5%), and resided in the Southern United States (59.3%). The most common barriers reported were financial strain (20.3%), perceived discrimination (14.8%) and transportation difficulties (11.6)%. Nearly two-thirds of respondents engaged in physical activity in the past 30 days, and 62.8% abstained from alcohol use, but only one quarter had a normal BMI. Significant associations were found between SDOH and age, sex, income, and rurality ($P<.05$).

Conclusion: Black individuals with a history of melanoma continue to face structural and social barriers that contribute to delayed care and poorer outcomes. Addressing these disparities requires structural and individual level interventions such as patient navigation programs and mobile dermatology clinics. Longitudinal studies are recommended to evaluate the efficacy of these interventions in improving healthcare access and outcomes for this population.

Keywords Black, melanoma, barriers, healthcare, social determinants

Title: Shifts in Outcome Reporting Across ClinicalTrials.gov and Published Results in Psoriasis Trials: A Registry-Publication Comparison Study

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Abstract

Introduction/Objectives: Prospective registration of prespecified outcomes is essential to clinical trial transparency and interpretability. Regulatory frameworks such as the FDA Amendments Act (FDAAA) Final Rule require outcome registration and documentation of changes; however, outcomes may evolve during a trial. When modifications are not transparently disclosed, confidence in reported findings may be undermined. This study aimed to evaluate the frequency, timing, and disclosure of outcome modifications in interventional psoriasis trials registered on ClinicalTrials.gov after implementation of the FDAAA Final Rule.

Methods: We conducted a registry-based cross-sectional analysis of interventional psoriasis trials registered on ClinicalTrials.gov with start dates between January 18, 2017, and December 31, 2024, and with posted results. Original and most recent registry versions were compared to identify outcome modifications, classified by type, timing, and outcome category (primary, secondary, other). Matched peer-reviewed publications were reviewed to assess disclosure of changes. We developed an Outcome Load Index and a Severity-Weighted Change Score to quantify outcome density and the potential impact of modifications. Descriptive statistics, Cochran's Q and McNemar's tests, Kaplan-Meier analyses, correlation analyses, and nonparametric subgroup comparisons were performed.

Results: Seventy-eight trials met inclusion criteria; most were phase 3 (60%; 47/78) and industry-funded (97.4%; 76/78). All trials exhibited at least one post-registration outcome modification, and 98.7% (77/78) had changes to prespecified outcomes. Most modifications occurred after the primary completion date (57.7%; 45/78) or after publication (41%; 32/78), with a median of 2 revisions per trial. The most frequent modifications were broad-to-specific refinements and minor rewordings, particularly among secondary outcomes. Additions and removals of secondary outcomes were common, whereas changes to measurement instruments were rare. No trial disclosed outcome modifications in either the ClinicalTrials.gov registry or the corresponding publication. Outcome Load Index was not associated with the number or severity of outcome changes, and severity-weighted scores did not differ significantly by funder type or intervention category.

Conclusions: Outcome modifications in psoriasis trials are widespread, frequently occur after data collection or publication, and are often undisclosed. Although some changes may represent legitimate refinements, the lack of transparency limits interpretability and reproducibility. Improved disclosure of outcome modifications in both trial registries and publications is necessary to strengthen confidence in the evidence base of psoriasis clinical trials.

Title: Effects of neuropeptide targeting agents in combination with approved Anti-Obesity Drugs on weight loss.

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Abstract

Background: Obesity is a global public health challenge characterized by chronic low-grade inflammation that contributes to metabolic dysfunction and elevates the risk for cardiometabolic disease. Neuropeptide systems are a central regulator of energy homeostasis suggesting that neuropeptide-targeting therapies coupled with existing first line treatment options may have greater weight loss.

Methods: Male and female mice were assigned to one of four treatment groups: vehicle (intraperitoneal injections of saline and DMSO), a high-dose neuropeptide–targeting drug (intraperitoneal injections of 3 mg/kg administered twice daily), a high-dose FDA-approved anti-obesity drug regimen , or a combined high-dose treatment consisting of both interventions. Treatments were administered for 10 days, during which body weight was recorded daily.

Results: There was a greater weight loss in the combination group when compared to the individual treatments.

Conclusion: Combination treatments can be a future option for achieving better weight loss.

Keywords: Neuropeptides, Weight loss, Obesity

Title: The use of GLP-1 agonists among pediatric patients with Type 1 Diabetes: A scoping review of safety, efficacy, and potential for long-term usage.

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Abstract

Background: Type 1 diabetes (T1D) is a chronic autoimmune condition often diagnosed in childhood, requiring lifelong insulin therapy to maintain glycemic control and prevent complications. While technological advances such as continuous glucose monitors and insulin pumps have improved management, the availability of Glucagon-like peptide-1 receptor agonists (GLP-1RAs), used in type 2 diabetes and pediatric obesity, may offer potential benefits for those with T1D through mechanisms such as delayed gastric emptying, reduced glucagon secretion, and appetite suppression. While off-label use is increasing among children with T1D, the current evidence on the efficacy and safety is limited.

Methods: We conducted a scoping review to examine the current evidence base regarding the use of GLP-1RAs in pediatric patients with T1D. Database searches were conducted on 3/4/25, with results screened and data extracted by two authors (ED, OF) in a masked, duplicative fashion.

Results: Our search of PubMed, Embase, and Cochrane databases yielded 132 items, which, after screening, we excluded due to not involving children, not being type 1 diabetes studies, not including GLP1RAs, or not involving human subjects. Of the remaining 16 articles, the most common themes regarding efficacy and safety suggest these agents may reduce HbA1c, insulin requirements, and body weight without significantly increasing the risk of hypoglycemia. However, concerns about gastrointestinal side effects and the potential for diabetic ketoacidosis (DKA) remain.

Conclusion: GLP-1RAs are not currently approved for use in patients with Type 1 Diabetes at any age. However, as GLP-1 RA use in T1D becomes more common, additional research is required in the pediatric population to clarify safety and efficacy before adopting this treatment clinically.

Title: Evaluating AI-Generated Pediatric Vaccination Information: An Assessment of ChatGPT and Google Gemini

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Abstract

Background: Vaccine hesitancy remains a critical global health concern, and artificial intelligence platforms have become increasingly common sources of health information. This study evaluated the quality, transparency, and readability of pediatric vaccination information provided by OpenAI's ChatGPT and Google Gemini.

Methods: A cross-sectional analysis was conducted on September 25, 2025, extracting 20 frequently asked questions about pediatric vaccinations from both ChatGPT (version 5.1) and Google Gemini (Gemini 3). Questions were classified using Rothwell's framework into Fact, Policy, and Value categories. Information quality of the sources cited was assessed using JAMA benchmark criteria, Brief DISCERN scores, and the Patient Education Materials Assessment Tool (PEMAT). Readability of the LLM-generated answers was evaluated using Flesch-Kincaid Grade Level and Flesch Reading Ease formulas.

Results: Both platforms predominantly generated fact-based questions (ChatGPT: 60.0%; Gemini: 55.0%). Neither platform achieved "good" quality scores on JAMA benchmark criteria, with particular deficiencies in authorship attribution (ChatGPT: 0%; Gemini: 10.0%). Gemini demonstrated higher source attribution than ChatGPT (55.0% vs. 5.0%). Mean Brief DISCERN scores indicated moderate quality content (ChatGPT: 22.20; Gemini: 20.50). PEMAT analysis revealed adequate understandability of cited sources (ChatGPT: 74.6%; Gemini: 60.8%) but severely limited actionability (both <10%). Readability levels exceeded the sixth-grade level recommended for patient education materials.

Conclusions: Despite widespread use, ChatGPT and Google Gemini generate pediatric vaccination information using sources with significant deficiencies in transparency, source attribution, and actionability. These limitations pose risks to informed healthcare decision-making, particularly in the context of ongoing vaccine hesitancy. Healthcare providers must supplement AI-generated vaccine information with evidence-based education, and further research is needed to assess the impact of AI-derived health information on vaccination behaviors.

Key Words: Pediatric Vaccinations, LLM, FAQ

Title: Understanding Without Action: Online ADHD Patient Education Resources Recommended by ChatGPT and Google Gemini Lack Actionable Guidance

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Abstract

Background: Large language models (LLMs) are increasingly used by patients to seek health information and frequently provide links to external websites for further reading. While prior studies have evaluated AI-recommended resources for surgical conditions, the quality and accessibility of resources recommended for mental health conditions such as attention-deficit/hyperactivity disorder (ADHD) remain poorly characterized.

Objective: To evaluate the quality, transparency, understandability, actionability, and readability of online health information resources recommended by ChatGPT and Google Gemini for frequently asked questions about ADHD.

Methods: This cross-sectional content analysis evaluated 40 FAQ-URL pairs generated by ChatGPT and Google Gemini in response to standardized prompts regarding ADHD. Websites were assessed using the JAMA Benchmark Criteria for transparency, the Brief DISCERN instrument for information quality, the Patient Education Materials Assessment Tool (PEMAT-P) for understandability and actionability, and Flesch-Kincaid Grade Level and Flesch Reading Ease metrics for readability. Questions and website sources were categorized using Rothwell's classification system. Descriptive statistics and non-parametric comparisons were performed.

Results: Most FAQs generated by both models were classified as Fact questions (ChatGPT: 70.0%; Gemini: 80.0%), primarily addressing symptom presentation, diagnostic criteria, and neurobiological mechanisms. Academic websites were the most commonly recommended source (n = 19), followed by commercial (n = 8), government (n = 8), and medical practice websites (n = 5). Gemini-recommended websites demonstrated higher transparency than ChatGPT-recommended websites (mean JAMA scores 2.80 vs. 1.65), with Gemini sources more frequently meeting criteria for authorship (50.0% vs. 5.0%) and attribution (55.0% vs. 20.0%). Understandability scores were moderate (ChatGPT: 67.5%; Gemini: 61.2%), but actionability scores were critically low (ChatGPT: 5.0%; Gemini: 10.0%). Readability was poor, with mean Flesch-Kincaid Grade Levels of 17.4 for ChatGPT and 16.0 for Gemini. Both tools indicated graduate-level reading requirements that far exceed the 6th-8th grade recommendation for patient education materials.

Conclusions: Online health information resources recommended by LLMs for ADHD FAQs are moderately understandable but critically deficient in actionability, providing explanatory content without concrete guidance for patient self-management. Resources are written at reading levels that far exceed recommendations and demonstrate variable transparency. The actionability gap is particularly concerning for patients with ADHD, who may face executive function challenges in translating explanatory information into action. Clinicians should be aware of these limitations when counseling patients who use AI tools and may consider directing patients to more actionable, accessible resources.

Keywords: ADHD, AI, Patient Facing Education Material

Title: A Comparative Analysis of Frequently Asked Patient Questions and Answer Quality for Antidepressants Generated by ChatGPT and Google Gemini

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Abstract

Introduction/Objectives: With the increasing accessibility of artificial intelligence (AI) platforms, patients are able to refer to them when considering their medical decisions. Given this, it is critical that the information presented to them is appropriate and verified, particularly if they are frequently asked questions (FAQs). This study aims to assess the FAQs and quality of resources presented by ChatGPT and Google Gemini for antidepressants.

Methods: The top 20 FAQs with respective answers and sources for antidepressants were obtained on ChatGPT and Google Gemini. FAQs were classified using the Rothwell classification. FAQ answer source information transparency was scored using the Journal of the American Medical Association's (JAMA) benchmark criteria, and the quality was analyzed using the Brief DISCERN score. Understandability and actionability for patients were assessed using the Patient Education Materials Assessment Tool (PEMAT). The readability of FAQ answer sources was scored using the Flesch Kincaid Grade Level (FKGL) and Flesch Reading Ease (FRE) formulas.

Results: ChatGPT presented more academic sources (55%; 11/20) than Gemini (25%; 5/20); all references by both AI platforms were active, accessible URLs. The most common Rothwell classification was "Policy" for both ChatGPT (50%) and Gemini (45%). Most JAMA benchmarks exhibited similar compliance between AI models, though Gemini had a greater mean JAMA score (3.10) compared to ChatGPT (2.70). Total DISCERN scores were similar between ChatGPT (30.30) and Gemini (30.50), but ChatGPT had a greater total PEMAT score of 53.8% compared to Gemini (43.9%). The average FRE and FKGL scores were 28.0 and 13.1 for ChatGPT and 32.0 and 13.0 for Gemini.

Conclusions: Patients should exercise caution when employing AI search engines to explore antidepressants. The variation seen in the types of references combined with their suboptimal scores of transparency, quality, understandability and actionability, and readability impose inconsistencies in the information that patients seek, which may negatively influence their medical decisions. By addressing FAQs about antidepressants and improving the quality and readability of their presented references, patient understanding can be enhanced and lead to more compliant care.

Keywords: Artificial intelligence in healthcare, Antidepressants, Patient education

Title: **Achilles Tendon Loading in Minimalist vs Traditional Footwear: A Critically Appraised Topic**

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Abstract

Introduction/Objectives: Footwear selection, particularly heel elevation, can influence the mechanical forces placed on the Achilles tendon. In light of the high prevalence of Achilles tendon injuries among elite athletes and the growing popularity of minimalist footwear, this Critically Appraised Topic (CAT) examines the effects of minimalist shoes on Achilles tendon loading compared with traditional cushioned or heel-lifted footwear.

Methods: A systematic literature search was conducted using terms related to Achilles tendon loading, minimalist footwear, and traditional shod footwear. The initial search yielded 41 studies. After applying inclusion and exclusion criteria, three studies were selected for critical appraisal.

Results: Across the included studies, minimalist footwear was associated with increased Achilles tendon mechanical demand compared to traditional shod footwear. Findings demonstrated increased peak Achilles tendon force, increased loading rate, and increased peak tendon stress. These effects were most evident during running and were also observed during walking with reduced heel elevation.

Conclusions: Minimalist footwear increases Achilles tendon loading relative to traditional cushioned or heel-lifted footwear during walking and running. Despite increased mechanical demand, no significant increase in Achilles tendon cross-sectional area was observed within the study timelines of up to 12 weeks. While increased loading may facilitate tendon adaptation, the role of minimalist footwear in Achilles injury prevention remains unclear.

Keywords: "Plantar Pressure" and "Achilles Tendon Loading" and "Minimalist" and "Shod"

Title: Associations between Childhood Trauma, Social Determinants of Health, and Arthritis Pain

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Abstract

Introduction: Arthritis is one of the leading causes of chronic pain, and is increasing in prevalence within the U.S. Adverse childhood experiences (ACEs) and social determinants of health (SDOH) have also been associated with health consequences in adulthood. Our objective was to investigate the relationship between ACEs, SDOHs, and arthritis pain, to determine factors affecting the health of affected individuals.

Methods: We performed a cross-sectional analysis utilizing the 2023 BRFSS data. We included participants who met the criteria of: (1) a self-reported physician diagnosis of arthritis, (2) a reported joint pain rating within the past 30 days using a 0–10 scale, (3) completed responses to the ACEs module [0-11] and (4) completed the Social Determinants of Health Module [0-13]. We used path analysis to construct a multi-modal regression model to identify the direct effects of ACEs on arthritis pain and the indirect effects through SDOH.

Results: Our findings showed that ACEs had significant direct effects and indirect effects on arthritis pain scores—showing that for each ACE experienced, pain scores increased by .15 points (P <.001). Conversely, for each SDOH experienced, there was a 0.31 point increase in pain score (*P* <.001). Sedentary lifestyle, insurance, age, and income were significantly associated with ACEs, while sedentary lifestyle, insurance, income, and education were significantly associated with pain score. Compared to White respondents, Black respondents reported a 0.54 point higher pain score when controlling for other factors.

Conclusions: Our study determined that both ACEs and SDOH factors have significant direct effects on arthritis pain scores in adulthood. ACEs also had an impact on SDOH, which indirectly increases the effects on arthritis pain. Further research should be done to investigate the relationship between ACEs, SDOH, and arthritis pain to identify and treat arthritis earlier in disease progression and prevent unfavorable health outcomes.

Funding: None

Keywords: Adverse Childhood Experiences, Social Determinants of Health, Arthritis

Title: Assessing Selective Outcomes in Randomized Controlled Trials of Sleep Disorders: A Registry-Publication Comparison Study

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Abstract

Background: Despite the presence of reporting guidelines for randomized controlled trials (RCTs), discrepancies between registered and published outcomes remain common. By clarifying how outcome definitions shift in sleep medicine trials, this work aims to strengthen the evidentiary foundation of sleep disorder research and support more consistent, transparent, and clinically meaningful reporting practices

Methods: We conducted a cross-sectional study using data from ClinicalTrials.gov to examine the extent and transparency of outcome modifications in interventional trials related to sleep disorders. Eligible trials were identified through registry searches, and for each, we compared the original registration entry to its most recent version to detect any changes to prespecified outcomes.

Results: Of 54 eligible interventional sleep medicine trials, 51 (94.4%) exhibited at least one substantive outcome modification, with an average of five modifications per trial (IQR 2–8). High-impact changes affecting primary outcomes occurred in 48.1% of trials, while only 5.6% demonstrated full adherence to all prespecified outcomes. Modifications most frequently involved clarification or increased specification (61.1%), outcome additions (57.4%), and removals (40.7%), predominantly affecting primary (83.3%) and secondary outcomes (81.5%). Outcome changes were most often introduced after primary completion (60.8%) or after publication (37.3%). 90.2% of modified trials did not disclose changes in either the registry or the publication. Secondary outcomes carried the greatest modification burden, with significantly higher numbers of changes per trial compared with primary and other outcomes.

Conclusions: This study identifies an area where there may be room for improvement in the disclosure of changes to prespecified outcomes in sleep disorder trials, despite regulatory efforts to prevent such practices.

Keywords: Sleep Medicine, RCTs, Transparency, Outcome Reporting

Title: SDOH role in CVD amongst rural populations across US regions

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Abstract

Introduction: According to data from the 2017 Centers for Disease Control and Prevention (CDC) there is a higher prevalence of CVD among rural residents. Increased risk of CVD for individuals living in rural areas are multidimensional and have been linked to poorer social determinants of health (SDOH). Future projections for CVD in the United States indicate a continued rise in prevalence. According to The American Heart Association Clinical CVD disease is projected to affect about 45 million people by the year 2050. Given the prevalence of CVD, examining population-based data by rurality and regionality of social determinants of health may allow for precise and more targeted strategies which may lead to better health outcomes.

Methods: We conducted a cross-sectional analysis of the 2022 BRFSS data to determine rates of SDOH across the United States. We analyzed the 10 items from the SDOH module, including mental health and social support, employment, food security, housing stability, transportation, and additional measures of barriers to medical access. We assessed these SDOH across regions and rurality and created a heatmap showing where individuals report experiencing 3 or more negative SDOH by census division.

Results: Compared with Northeast urban residents, residents in the South had significantly higher rates of several poor SDOH indicators, including not being able to afford to see a doctor when needed, lacking medical checkups, and elevated rates of food insecurity ($P < .05$). West urban residents had significantly greater odds of not completing routine checkups ($P < 0.001$) and frequent loneliness ($P = 0.009$) compared to the reference group.

Conclusion: Our results highlighted the link between poor SDOH and elevated cardiovascular disease rates particularly amongst rural Southern populations compared to the reference group. Addressing these factors can significantly reduce disparities and improve overall health in these populations.

Title: Cloning and Recombinant Expression of *Prevotella intermedia* Interpain A (InpA)

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Abstract

Introduction/Objectives: *Prevotella intermedia* is an anaerobic oral bacterium associated with periodontal disease and chronic inflammation, conditions linked to the development and progression of oral squamous cell carcinoma (OSCC). Interpain A (InpA) is a cysteine protease produced by *P. intermedia* and is considered a potential virulence factor that may influence OSCC cell proliferation and migration. In our preliminary studies, treatment of OSCC cells with *P. intermedia* culture supernatant increased cell proliferation and migration, and this effect was significantly reduced in the presence of a cysteine protease inhibitor, suggesting that a cysteine protease, likely InpA, is a key mediator of these responses. Therefore, the objective of this study was to clone the *inpA* gene into the pET28a expression vector, verify its DNA and protein sequence, express recombinant InpA in *Escherichia coli*, and establish a foundation for protein purification and direct testing of InpA in OSCC proliferation and migration assays.

Methods: Genomic DNA from *P. intermedia* was used as a template to amplify the ***InpA*** gene using gene-specific primers and high-fidelity polymerases.

The amplified DNA fragment (1107 bp) and pET28a vector were digested with **XhoI** and **NcoI restriction enzymes,** followed by ligation using **T4 DNA ligase.** The recombinant pET28a-InpA plasmid was heat shock transformed into ***E. coli* TOP10F'** competent cells. Positive clones were confirmed by colony PCR and restriction enzyme digestion. Sequencing confirmation was performed using primers corresponding to T7 promoter and T7 terminator regions of pET28a. Amino acid sequence alignment was performed using SnapGene and the reference genome P. intermedia ATCC 25611. To minimize leaky expression and reduce potential protein toxicity associated with InpA expression, the sequence-verified pET28a–InpA construct was transformed into *E. coli* BL21(DE3) pLysS cells for recombinant protein expression and evaluated by anti-His Western blotting.

Results: The *InpA* gene was successfully amplified by PCR, producing a clear band at the expected size (1107 bp). Following digestion and ligation, the recombinant pET28a–InpA construct was obtained, and several positive colonies were verified by colony PCR and restriction enzyme digestion.

Sequence analysis using T7 promoter and T7 terminator primers, together with the amino acid alignment, showed 100% identity with the reference *Prevotella intermedia* InpA sequence.

Anti-His Western blot analysis detected bands at approximately 27 and 36 kDa, consistent with the known autocatalytic processing of InpA from an inactive zymogen to a mature active enzyme. Although purification of recombinant InpA is still in progress, these results confirm successful cloning and expression of recombinant InpA and demonstrate that the validated pET28a–InpA construct is prepared for further protein purification and subsequent evaluation of InpA effects on OSCC cell proliferation and migration.

Conclusions: This study represents an initial step toward understanding the role of Interpain A in the ability of *Prevotella intermedia* to promote OSCC progression. While the results presented here focus on cloning, sequence verification, and preliminary expression, the validated pET28a–InpA construct provides a foundation for further optimization of protein purification. These preliminary results will support future studies focused on directly testing the effects of purified InpA on OSCC cell proliferation and migration.

Title: Urban-Rural Differences in Healthcare Utilization Among Children with Epilepsy: Identifying Factors Associated with Adequate Care Using the National Survey of Children's Health

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Abstract

Introduction/Objectives: Epilepsy affects an estimated 470,000 U.S. children and is associated with increased comorbidities and premature mortality. Access to specialized care is critical but remains limited by financial constraints, shortages of neurologists, and geographic disparities. Pediatric rural epilepsy care is understudied, and little is known about differences in access and quality of care between rural and urban children with epilepsy (CWE). This study evaluated differences in care between children with and without epilepsy, and between rural and urban CWE.

Methods: We conducted a cross-sectional analysis of 2021–2023 National Survey of Children's Health (NSCH) data, representative of U.S. children aged 0–17 years. Children were classified by parental report of an epilepsy diagnosis. Outcomes included healthcare access (insurance, personal doctor, specialist visits, referral difficulty) and patient- and family-centered care (PFCC) measures. Survey weights and design-based χ^2 tests compared children with and without epilepsy, and rural–urban differences among CWE.

Results: Of 145,720 children, 888 (0.6%) had epilepsy; 11.6% resided in rural areas. CWE were more likely to have a personal doctor, but parents more often reported frustration accessing services. PFCC ratings were lower for CWE, including providers who always listened carefully, showed sensitivity to family values, and provided needed information. No significant rural–urban differences were found among CWE.

Conclusions: Caregivers of CWE reported lower PFCC in listening, cultural sensitivity, and provision of information, alongside greater frustration accessing services. Improving provider–caregiver communication and streamlining service access may enhance satisfaction and continuity of care. Limitations include a lack of epilepsy severity data and a small epilepsy subsample. Future research should incorporate standardized satisfaction measures and detailed clinical data to guide interventions.

Keywords: Rural, Pediatric, Epilepsy, Patient- and Family-Centered Care

Title: Structural Brain Changes in Children Following COVID-19 Infection: A Cross-Sectional Analysis of the ABCD Study

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Abstract

Introduction/Objectives: The impact of the COVID-19 pandemic on child development is an evolving area of study. However, the effects of prior COVID-19 infection on brain structures critical for autonomic and behavioral functions remain understudied. This study aimed to assess structural differences in the brainstem, cerebellum, and associated regions among children with a reported history of COVID-19 infection compared to those without, using data from the Adolescent Brain and Cognitive Development (ABCD) Study.

Methods: We conducted a time-series analysis of magnetic resonance imaging (MRI) data from the ABCD study, a large-scale, longitudinal open-data neuroimaging cohort study that consists of approximately 12,000 children born between 2006 and 2008 at 21 sites across the United States. Regression analyses were used to compare volumetric growth in the brainstem, cerebellum, and related structures between pre-pandemic (2018-2019) and post-pandemic (2021-2022) scans. Cognitive performance at the 4-year follow-up was evaluated using the NIH Toolbox Cognition Battery.

Results: Of the 2,423 children in the sample, 195 reported a history of COVID-19 infection. This group exhibited significantly reduced volumes in the brainstem, cerebellum, hippocampus, amygdala, and accumbens area compared to those without prior infection. They also scored lower on the Picture Vocabulary, Flanker Inhibitory Control and Attention, and Oral Reading Recognition Tasks.

Conclusions: Previous COVID-19 infection was associated with reduced volumes in the brainstem and cerebellum, as well as lower cognitive performance in children. These findings suggest potential long-lasting implications for brain regions involved in autonomic regulation, motor coordination, and cognitive function. Further research is needed to assess the persistence of these changes and explore potential interventions.

Keywords: COVID-19, Pediatric Brain Development, Brainstem Volume, Cognitive Function

Title: Proteomics Study Reveals a Gender-based Differential Expression of RPS4Y1 as a tumor suppressor gene in males with Hepatitis C Virus -Related Cirrhosis and Hepatocellular Carcinoma.

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Abstract

Introduction/Objectives: Hepatitis C virus (HCV) infection is a leading cause of cirrhosis and hepatocellular carcinoma (HCC) globally. While different biomarkers for HCV progression are currently being researched, there is little known about sex-based biomarkers. Basal Estrogen Receptors ∝ and β Expressed in Normal Male & Female Liver Tissues (Iyer JK et al., 2017) showed that liver estrogen receptor (ER)-mediated sex-based differences exist between normal male and female liver tissues. This research indicated that ER binding in pre-menopausal women may have protective effects in HCV cirrhosis and HCC, which calls for further research on gender-based biomarkers. This research led us to investigate genes encoding cytoplasmic ribosomes, specifically ribosomal protein S4 (RPS4), as it is the only ribosomal protein known to be encoded by more than one gene. RPS4Y is a Y-linked polyclonal RPS4 whose isoforms (RPS4Y1, RPS4Y2) are structurally different but functionally identical. RPS4Y dysregulation has been studied in different cancers, and recent research has identified the Y-linked gene RPS4Y1 as a tumor suppressor in male-specific cancers like multiple myeloma (MM). However, it's role in sex-based differences in HCV-induced cirrhosis and HCC has not been explored. This study aimed to evaluate the sex-based differential expression of RPS4Y and its potential role as a biomarker in HCV-induced cirrhosis and HCC progression.

Methods: Our present study utilized 65 (healthy, cirrhosis, HCC) liver tissues obtained from NIH Liver Tissue Bank and mapped 4445 proteins, including RPS4Y1 using an advanced mass spectrometry-based DIA proteomics method. The human liver tissue sections were evaluated using Immunohistochemistry (IHC) and RPS4Y1 protein expression was validated. Image analysis and quantification was performed using QuPath software.

Results: Immunohistochemical analysis of RPS4Y1 revealed a cytoplasmic localization of the protein with varying intensities in all tissue groups. Proteomics analysis showed a non-significant but moderately lower expression in both the male and female HCV cirrhosis tissues in comparison with their controls and significantly lower expression in HCV females in comparison to the HCV males. However, HCC males and females displayed no significant change in RPS4Y1 expression in comparison to their controls and significantly low expression in HCC female compared to the HCC males.

Conclusions: RPS4Y1 (ribosomal protein S4, Y-linked 1) is a Y-chromosome gene implicated in various cancers, also acting as regulator of inflammation and tumor suppression. The moderately lower expression of RPS4Y1 in HCV males compared to the controls can be attributed to downregulation or dysregulation of the tumor suppressor function and triggering HCV related liver disease progression to

HCC. The overall lower expression in all the female cohorts compared to the males needs investigation in context of RPS4X as a sex-based modulator of the disease. The study will be extended, including a larger group of patients to further support the current hypothesis.

Keywords: Hepatitis C virus, cirrhosis, hepatocellular carcinoma, gender, RPS4Y1

Title: Chronic Umbilical Wound in a Young Adult: A Case Report Highlighting the Barriers and Biases Influencing Wound Care Accessibility

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Abstract

Introduction: Chronic wounds affect an estimated 6.5 million individuals in the United States, with associated costs ranging from $28 to $96 billion annually. Although traditionally associated with older adults, diabetes, or vascular disease, chronic wounds can also affect younger patients—particularly those impacted by social determinants of health (SDOH). Patients from lower socioeconomic backgrounds are up to twice as likely to experience wound complications due to reduced access to care, food insecurity, and limited health literacy. Addressing these SDOH factors has been shown to significantly reduce wound duration and recurrence, especially in marginalized communities.

Case Presentation: A 31-year-old female with a complex medical history—including long COVID, PTSD, and lymphedema—presented with an open, non-healing umbilical wound of unknown origin, with symptoms persisting for over two months.

Despite repeated outpatient visits—including six primary care encounters, three dermatology visits, and a surgical consultation—she did not receive wound imaging or a formal wound care referral. Two clinicians declined to examine the wound due to assumptions about limited wound visibility due to body habitus. Over eight months, she received multiple empiric treatments, including five oral antibiotics, topical antibiotics, and topical antifungals. Repeated wound cultures, urine cultures, and medications exacerbated patient financial burden, and a proposed omphalectomy was canceled due to financial barriers.

Methods: Data collected for this case presentation was performed through electronic health record, billing review, and patient interview, with patient consent.

Results: After transitioning to a new primary care provider, imaging was obtained and wound care initiated. Within four weeks of consistent outpatient debridement and dressing changes, the wound showed marked improvement. Ultimately, the cost differential between the proposed treatment course and wound care interventions was over 7,000 dollars with insurance and over 19,000 dollars without insurance.

Discussion: This case highlights how clinical bias, assumptions about risk, and systemic barriers can delay essential wound care—even in younger patients. The lack of early imaging, physical examination, and appropriate referral resulted in prolonged morbidity and unnecessary antibiotic exposure.

Despite the proven benefits of multidisciplinary wound care centers—including cost savings through hospitalization prevention—these services remain underutilized, often due to under-referral or misperceptions about patient candidacy. In particular, assumptions based on age, body habitus, or perceived risk can lead to underdiagnosis, delayed treatment, and poor outcomes.

Conclusion: Atypical presentations of chronic wounds in young, non-diabetic adults deserve thorough evaluation and structured follow-up. This case underscores the need for equitable wound care access, provider education, and the integration of SDOH considerations into clinical decision-making.

Keywords: social determinants of health, wound care, healthcare utilization

Title: Quantifying Cyclic Changes in Background Parenchymal Enhancement in Breast Tissue MRIs During Menstrual Cycle

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Abstract

Introduction: Background Parenchymal Enhancement is visualized as the lighter areas of fibroglandular breast tissue in MRI scans due to contrast accumulation in areas of higher vascular permeability or areas that have recently undergone neoangiogenesis; a prolific trait of tumors as well as a response to increased estrogen levels. Research (Arslan et al., 2017) has demonstrated a direct relationship between estrogen and BPE, peaking between days 1-6 and 21-28 of the menstrual cycle. BPE is assessed and categorized as: minimal < 25%, mild 26-50%, moderate 51-75%, and marked <75% (typically interpretive as indicative of breast cancer). A radiologist makes a ***qualitative*** assessment and assigns a category. Some institutions employ quantitative measurement protocols, varying between organizations. Currently, there is no standard method of quantifying BPE (Liao et al., 2019).

Developing a method of quantifying cyclic changes in BPE and establishing optimal timing for breast cancer screening, can assist in enhancing diagnoses beyond 'one size fits all' mechanisms. This will empower physicians to use individualized approaches to predict cancer development leading to quicker/less invasive diagnosis as well as offer a way to monitor cancer treatment response. My goal is to examine the natural changes of BPE in relation to the 28 day hormonal cycle of a healthy adult female to further the efforts of establishing a quantitative base-line. Since breast cancer has such an astounding death rate, with 670,000 women dying per year globally (WHO, 2022), and improvement seen in those diagnosed early; this study is essential for combating this devastating pathology.

Methods: We will perform a total of four dynamic T1-weighted contrast-enhanced sequence scans of one participant, one scan completed in the middle of each phase of the menstrual cycle (1st on the 3rd day, 2nd on the 11th day, 3rd on the 18th day and 4th on the 27th day) following the administration of contrast. We will measure the participant's hormone levels through a local lab, simultaneously with the scans to correlate with the visualized levels of BPE. We plan to compile current equations used to measure BPE to determine which equation produces the least amount of error and is easily reproduced when applied to a range of breast tissue MRI scans.

Results: These results will contribute to the research supporting the relationship between BPE and estrogen levels. This study will generate quantitative data to support establishing a baseline of BPE in a healthy individual at different times of the menstrual cycle. We expect to establish an equation suitable for measuring BPE across all patient types which can then be applied to patients with pathologies such as breast cancer or hormonal disruptions.

Conclusions: This study will contribute to individualizing early breast cancer screening modalities and cancer treatment response monitoring by establishing a universal quantitative measure of BPE. And at the very least, contributing data to the pursuit. This research can enable disease detection at its most treatable stage, giving patients the invaluable gift of timely treatment, restored health, and peace of mind.

Title: Impact of Pre-Existing Mental Health Conditions on Sport-Related Concussion Symptoms in Collegiate Athletes

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Abstract

Clinical Scenario: Sport-related concussions (SRC) can have a wide range of effects on an athlete's physiological and psychological health. Collegiate athletes with pre-existing mental health disorders (anxiety, depression) and/or attention-deficit/hyperactivity disorder (ADHD) may be susceptible to higher symptom severity, prolonged concussion symptoms, and prolonged recovery duration.

Clinician Question: Are pre-existing mental health disorders (anxiety, depression) and/or ADHD associated with higher symptom severity, prolonged concussion symptoms and recovery duration in collegiate athletes following an SRC?

Summary of Key Findings: Collegiate athletes who reported anxiety or depression without being diagnosed did not have statistically different scores post-injury than neurotypical collegiate athletes. Collegiate athletes with preexisting ADHD had quicker return to play than those without ADHD.

Clinical Bottom Line: Collegiate athletes diagnosed with pre-existing ADHD may have a decreased recovery time after sustaining a concussion. Those with pre-existing diagnosed depression, anxiety, or both did not have a statistically significant difference in recovery time or symptom severity compared to collegiate athletes without diagnoses.

Strength of Recommendation: The studies selected demonstrate Level B evidence due to conflicting results, specific sample size, and limited quality of evidence.

Title: Uncovering microbial genomic signatures reveals hidden potential of gut bacteria to influence host energy regulation

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Abstract

Introduction/Objectives: A substantial fraction of gut microbial diversity remains uncultivated, limiting functional insight into host–microbiome interactions. Using anaerobic culturomics workflows, we isolated three strains from vole cecum representing an undescribed genus within the family *Erysipelotrichaceae,* for which we propose the name *Erysipelamicrotus*. Given links between *Erysipelotrichaceae* taxa with metabolic health, inflammatory regulation, and SCFA metabolism, resolving genomic features of this lineage is essential for understanding potential contributions to host physiology.

Methods: Full-length 16S rRNA gene sequences identified *Dubosiella newyorkensis* as the closest relative (91.71% similarity), supporting a novel genus designation (<94.5% genus-level threshold, LPSN). Whole-genome sequencing was conducted using paired-end Illumina platforms. Reads were quality-filtered with FastQC and Trimmomatic and assembled de novo. Bioinformatically, genome quality was assessed with Anvi'o, gene prediction and annotation with Prokka, metabolic and biosynthetic gene cluster analyses with KEGG Mapper and antiSMASH, and comparative genomics with Cytoscape and Phandango to resolve strain-level divergence. Finally, *Erysipelamicrotus*-specific primer sets were designed using the VectorBuilder platform.

Results: All *Erysipelamicrotus* genomes assembled to ~2.3 Mb, with an average 97.0% completeness, 2.4% contamination, and ~39% GC content. Annotation revealed multiple genes relevant to host physiology, including ClpB*,* an enzyme implicated in protein folding and stability. This proteostatic activity has been shown to mimic human α-MSH, a key regulator of satiety responsible for reducing food intake through hypothalamic signaling in murine models. Additional genes such as *dnaJ*, *alr*, *glgP*, and *α-amylase*, indicate a robust stress-response repertoire and expanded carbohydrate-processing capacity. Collectively, these features suggest that *Erysipelamicrotus* participate in cross-domain metabolic or proteostatic interactions with the host, warranting further functional investigation into its role in gut physiology and energy homeostasis.

Conclusions: These findings expand our known anaerobic diversity and establish a framework for functional characterization of *Erysipelamicrotus*. The presence of *ClpB* highlights a potential role in host satiety and energy-regulatory pathways. Collectively, this work provides a foundation for mechanistic investigations, with *Erysipelamicrotus* emerging as a candidate modulator of host metabolic physiology and establishes a basis for future studies in gnotobiotic models and clinical cohorts.

Title: A review of the longevity and biochemical effects of different chemical compounds in total joint replacements

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Abstract

Introduction/Objectives: Arthroplasty is a surgery to reshape, reconstruct, or replace a diseased or damaged joint. This review investigates the different options for a total joint replacement, identifies the most common causes of need for revision, and concludes with an evaluation of the best materials for the joint application.

Methods: For our primary objective, articles were searched to identify the most common causes for revision. For our secondary objective, articles were searched to determine efficacy of different components for joint replacements.

Results: The most undesired side effect of joint arthroplasty is the need for revision, which can be caused by metal ion release, biofilm formation, or aseptic loosening. The best option for biocompatible joint replacement is a titanium-based alloy as the base material with bioactive coatings made of silicate glass which facilitates bone adhesion and growth. Ceramic coatings can limit biofilm formation, so on the exposed surface the metal should be coated with a nitride-based ceramic coating with a low coefficient of friction consisting of niobium to improve resistance to wear and minimize ion release and biofilm formation. This compound lowers the risk of aseptic loosening and the need for revision.

Conclusions: Joint replacement hardware must be biocompatible, release few metal ions, and be resistant to biofilms. Bare metals are not ideal for joint replacements because of their lack of biocompatibility, susceptibility to biofilms, and release of metal ions. However, metals are still necessary components of joint replacements due to their rigid structure. Therefore, a titanium-based alloy with a silicate glass coating for the base material and a nitride-based ceramic coating for the exposed surface is the best material option for a joint replacement.

Keywords: total joint replacement

Title: Identifying Barriers to Comprehensive Annual Diabetic Exams: A Quality Improvement Project

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Abstract

Introduction/Objectives: Diabetes mellitus (DM) can affect many body systems and is associated with numerous adverse health outcomes. American Indian/Alaska Native (AIAN) populations have a disproportionately high prevalence of DM nationally and in Oklahoma. The purpose of this quality improvement (QI) project was to identify barriers to completing all components of diabetic yearly visits and inform future efforts to improve visit compliance.

Methods: This project was conducted during a four-week family medicine clinical rotation at Sam Hider Health Center in Jay, Oklahoma in fall 2025. Paper surveys were distributed to patients scheduled for DM yearly visits and to clinic providers. Patient surveys assessed DM knowledge and barriers to completing specialty visits. Provider surveys assessed perceived reasons for incomplete visits.

Results: Surveys were completed by 10 patients and 11 health care providers. Most patients demonstrated high levels of DM knowledge. Many reported that the main reason they did not plan to visit a nutritionist, optometrist, or dentist was because they did not have scheduled appointments. In contrast, the majority of providers believed the reason patients did not visit offices other than their primary care provider (PCP) was lack of knowledge/interest.

Conclusions: Understanding barriers allows health care systems to tailor patient care to patient's unique needs. The findings from this study suggest a need for better communication between clinic staff and patients. Improving communication and scheduling processes may increase completion of DM yearly visits.

Keywords: diabetes mellitus, continuity of care, quality improvement, tribal health, preventative screening

Title: From door to disposition: demographic correlates of emergency department waittime, triage priority, and length of stay among people with schizophrenia

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Abstract

Introduction/objectives: Despite extensive pharmacological and psychotherapeutic efforts, the quality of life for patients with schizophrenia remains low. Societal stigma and avoidance, adverse medication effects, unhealthy lifestyles, and physical and psychiatric comorbidities are some of the contributing factors. In addition to poor well-being, schizophrenia patients have a life expectancy approximately 20 years less than the general population. Our objective was to identify variables that may impact morbidity and mortality in these individuals. The study analyzed patient visits in U.S. Emergency Departments (EDs) to create a profile of sociodemographics, comorbidities, and hospital outcomes for patients presenting with schizophrenia-spectrum disorders (SSDs).

Methods: We conducted a cross-sectional analysis of the 2019–2022 National Hospital Ambulatory Medical Care Survey (NHAMCS). Patients included had a diagnosis in the ICD-10 subgroup F20-29, denoting all SSDs. We then sorted by hospital outcome and comorbidity.

Results: Significant differences were found in sociodemographic profiles from ED visits among those with and without SSDs—with higher rates of males, non-White racial groups, urban-living, substance and alcohol use, depression, and HIV among the former group (P<.01). ED visits for these individuals were nearly twice as likely to be reported as repeats within the past 72 hours (8.4% compared to 4.3%, P=.0002). Among those admitted, 60.1% with SSD went to the mental health/detoxification unit compared to 3.3% of other visits, and their wait time, length of visit, and number of days in the hospital were significantly longer than the other visits (P<.05).

Conclusions: Our findings show sociodemographic and hospital-related disparities between patients with schizophrenia and the general population. The higher rates of comorbidities and prolonged hospital stays underscore the need to address systemic factors within and beyond EDs so that we may improve care coordination, reduce repeat visits, and optimize resource utilization.

Keywords: schizophrenia, emergency department waittime, sociodemographic disparities, hospital-related disparities

Title: **Effects of Long-term Perfluorooctanoic Acid (PFOA) on Protein Expression in Pancreatic Control and Tumor Cells**

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Abstract

Introduction/Objective: Pancreatic ductal adenocarcinoma (PDAC) is one of the most lethal forms of cancer (5-year survival rate < 10%) and the fourth leading cause of cancer deaths in the United States. Perfluorooctanoic acid (PFOA) is a synthetic part of a class of chemicals known as per-and polyfluoroalkyl substances (PFAS) or commonly referred to as *forever chemicals*. These substances are used commercially exhibiting ground and water contamination due to extensive persistence in the environment. Specifically, chronic PFOA exposure via contaminated drinking water, scratched cookware, and food products, has been linked to adverse health effects such as cancer. Our study observes and measures the effect PFOA has on pancreatic cells, healthy and cancerous.

Methods: Control pancreatic cells [hTERT-HPNE (ATCC CRL-4023)] and cancerous cells AsPC-1 (ATCC CRL-1682), PANC-1 (ATCC CRL-1469), and MIA PaCa-2 (ATCC CRL-1420) were cultured and maintained according to ATCC guidelines. Cell lines were treated with 100 µM PFOA for one week and ten weeks. These cell lines were then frozen back to allow for regrowth at any point. Frozen sets were re-established before running experimentation. ELISA, JC-10, Caspase 3/7 activity, and oxidative stress assays were employed to measure cellular health. We assessed several key proteins involved in various cellular processes such as metabolism, stress response, and apoptosis.

Results: Prolonged PFOA exposure differentially modified signaling, oxidative stress, and apoptotic pathways in healthy pancreatic and tumor cell lines. FOXO1 and FOXO3 expression increased with long-term exposure in control cells but showed marginal changes in tumor cells. mTOR and IDO were generally reduced in tumor cells following treatment. AKT expression increased after 1 week in Panc-1 but decreased in HPNE cells, with a significant reduction in PANC-1 at 10 weeks. PTEN was significantly reduced in PFOA-treated Panc-1 cells. PINK expression decreased in HPNE cells at 1 week relative to 10 weeks. RICTOR expression was higher in MiaPaca-2 but declined following prolonged exposure, while RAPTOR expression was reduced in HPNE cells after 10 weeks compared to 1 week. SIRT1 decreased two-fold in PFOA treated HPNE cells but increased two-fold in AsPc-1 at 10 weeks. MMP2 decreased in Panc-1 at 10 weeks, whereas MMP9 remained elevated in AsPC-1 cells. GATA4 and GATA6 displayed significant time dependent changes in HPNE cells. Basal oxidative stress increased significantly in HPNE cells after 10 weeks but decreased in MiaPaCa-2, while stimulated oxidative stress was reduced in PFOA-treated HPNE, Panc-1, and AsPC-1 but increased in MiaPaCa-2 at 10 weeks. Caspase activity increased in Panc-1 after 1 week but was significantly reduced in HPNE and MiaPaCa-2 following long-term exposure.

Conclusions: These findings demonstrate that chronic PFOA exposure promotes adaptive, rather than cytotoxic, responses in pancreatic cells. Non-cancerous cells appear to engage stress response and oxidoreduction regulatory pathways, leading to elevated basal oxidative stress and reduced apoptotic activity, consistent with cellular accommodation to persistent environmental stress. Tumor cells show

altered metabolic and growth signaling with reduced oxidative and apoptotic responses over time, suggesting metabolic adjustments encouraging survival. The momentary activation of apoptosis following 1 week exposure likely reflects an acute stress response that diminishes with continued exposure. Overall, chronic PFOA exposure may shift cellular homeostasis toward stress tolerance and survival.

Keywords: apoptosis, mitochondria, PFAS

Title: Exploratory Analysis of Estrogen-Mediated Expression of Genes Involved in Calcium Regulation in the PVN

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Abstract

Introduction: This study investigates how estrogen influences calcium regulation and its relationship to genes involved in endochondral ossification. Estrogen is known to affect hormone regulation and gene expression related to calcium homeostasis, including parathyroid hormone-like hormone (PTHLH), which encodes parathyroid hormone-related peptide (PTHrP), and the PTHrP/PTH receptor (PTH1R). These pathways contribute to calcium regulation both centrally and peripherally. However, the role of estrogen in modulating these mechanisms within the paraventricular nucleus (PVN) has not been previously examined.

Objective: Determine if estrogen influences the expression of genes associated with calcium homeostasis including PTHLH, PTH1R, and the calcium-sensing receptor (CASR)

Methods: All protocols were approved by OSU IACUC (protocol #2021-1278). Adult female Sprague-Dawley rats (n = 6) underwent bilateral ovariectomy. To mimic the 4-day estrous cycle, half (n = 3) received injections of 10 µg estradiol benzoate in 0.1 mL oil on days 1 and 2, while the remaining rats (n = 3) received oil only. Rats were euthanized on day 4, when estrogen levels were expected to peak. Tissue from the paraventricular nucleus (PVN) was extracted, and mRNA was isolated and sent to Thermo Fisher for microarray analysis. This study specifically investigated the completed microarray results using Transcriptome Analysis Console software.

Results: Preliminary findings indicate a significant decrease in PTHLH gene expression when estrogen levels are highest ($p < 0.01$; Cohen's $d = 2.25$). Although changes in calcium-sensing receptor (CASR) expression in the PVN were not statistically significant, a large effect size was observed (Cohen's $d = 1.42$), EB-treated rats showed increased expression. No differences were noted when comparing PTH1R between EB- and oil-treated rats

Conclusions: These exploratory findings indicate that within the PVN, EB may play a role in regulating genes associated with calcium regulation, and further studies are warranted. Our study was limited by sample size, a single time point, and an EB dose exceeding normal physiological range, therefore, findings should be viewed as exploratory.

Keywords: estrogen, calcium, paraventricular nucleus, parathyroid hormone-related peptide

Title: Tracking Outcome Changes in Chronic Kidney Disease Trials: A Version History Analysis of ClinicalTrials.gov Records

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Abstract

Background: Transparent and consistent outcome reporting is essential to the credibility of clinical research. This is particularly critical in chronic kidney disease (CKD), where trials frequently rely on complex, surrogate, and composite outcomes that are vulnerable to selective modification. Undisclosed changes to prespecified outcomes remain common and may introduce bias, potentially undermining the evidence base guiding CKD care. This study evaluated the frequency, timing, nature, and disclosure of outcome changes in CKD trials registered on ClinicalTrials.gov.

Methods: We conducted a registry-based cross-sectional analysis of 49 interventional CKD trials registered on ClinicalTrials.gov between January 18, 2017, and December 31, 2024. Registry version histories were reviewed and matched to corresponding publications to identify changes to prespecified outcomes. Outcome modifications were assessed for timing, type, impact, and disclosure.

Results: All 49 trials (100%) exhibited at least one outcome change, and none disclosed these changes in the registry or associated publications. More than half of outcome modifications occurred after trial completion or publication, and one-third were classified as high impact. Industry-funded and device trials demonstrated earlier and more severe outcome changes. Higher Outcome Load Index scores were strongly associated with increased frequency of outcome modifications ($r = 0.86$, $p < 0.001$).

Conclusions: Undisclosed outcome changes are pervasive in CKD trials, persisting despite strengthened trial registration requirements. Enhanced regulatory enforcement and stronger editorial oversight are needed to improve transparency and protect research integrity in nephrology.

Keywords: Chronic kidney disease, Clinical trial registration, Outcome reporting bias, Selective outcome reporting

Title: **Associations of Childhood Trauma with Osteoarthritis Pain in Adulthood**

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Abstract

Introduction/Objectives: Osteoarthritis (OA) is a joint disease that continues to increase in diagnoses worldwide, and early diagnosis is essential to reduce long-term pain and prevent physical limitations. Adverse childhood experiences (ACEs) have been associated with chronic pain from other chronic diseases; therefore, our objective was to evaluate the relationship between ACEs and OA-related pain, as well as investigate if any one ACE domain has a higher impact on OA pain.

Methods: We performed a cross-sectional analysis of the 2023 Behavioral Risk Factor Surveillance System (BRFSS). Respondents were included if they were 18 years or older and answered these questions: (1) they had been diagnosed with arthritis by a doctor, (2) reported their joint pain in the last 30 days on a scale of 0-10, and (3) completed responses from the BRFSS ACEs module.

Results: We found a statistically significant positive relationship between pain and ACE frequency ($P < .0001$), and between the number of ACEs and socioeconomic factors ($P<.0001$). Among individuals aged 18-24, 69.5% with OA had experienced 4+ ACEs, whereas 12.38% of individuals aged 65+ reported experiencing 4 or more. American Indian and Alaska Natives had the highest prevalence of 4+ ACEs (44.1%). The highest reported mean pain score was among Black individuals (M=6.0, SD=0.1). No statistically significant results were found between ACE domain and pain score.

Conclusions: Our study determined that ACE prevalence is associated with increased arthritis pain score. We also found that ACEs increase with certain socioeconomic factors such as female sex, American Indian and Alaskan Native ethnoracial group, and lower income. Further research should be done to assess the role of ACEs on arthritis incidence to identify those at risk and improve health outcomes.

Keywords: Osteoarthritis, ACE Domains, Pain

Title: **Outcome Modifications in Total Knee Arthroplasty Clinical Trials: A Cross-Sectional Registry Analysis**

Authors: *G Herring; N Camasso; K Keefer; R Sherry; A Elghzali; T Harris; D Archer; AI Ford; M Vassar*

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Abstract

Introduction/Objectives: Total knee arthroplasty (TKA) has become an increasingly personalized surgical intervention, with emerging technologies (e.g. computer-assisted navigation, augmented reality, and robotic assistance) offering multiple strategies for optimizing patient outcomes. Evidence from randomized controlled trials (RCTs) shapes clinical practice through American Academy of Orthopaedic Surgeons (AAOS) Clinical Practice Guidelines and shared decision-making. However, post-hoc modifications to prespecified outcomes, particularly when undisclosed, complicate evidence interpretation and raise transparency concerns. These undisclosed modifications to prespecified trial outcomes can undermine research transparency and complicate evidence interpretation.

Methods: We conducted a cross-sectional analysis of interventional TKA trials registered on ClinicalTrials.gov with start dates between January 18, 2017, and December 31, 2022. We compared original and most recent registry versions to identify outcome modifications and assessed disclosure in matched publications.

Results: Of 32 included trials, 31 (97%) exhibited at least one outcome modification. When restricted to high-impact modifications (additions, removals, or reclassifications), 18 trials (56%) had such changes. Common modifications included broad-to-specific phrasing shifts (53% of primary outcomes), minor rewording (50%), and outcome removals (more frequent among secondary outcomes: 38% vs. primary outcomes: 9%). Approximately half of modifications were documented after primary completion. Only one trial (3%) disclosed modifications with justification; three trials (9%) partially acknowledged changes without explanation.

Conclusions: Outcome modifications occurred in 97% of TKA trials, though only 56% involved high-impact changes. Only 3% provided full disclosure with justification, revealing substantial transparency gaps in TKA research.

Keywords: Total knee arthroplasty, Outcome modification, Research transparency

Title: Bridging the Evidence to Practice Gap: An Original Analysis of Peripheral Neuropathy Trials

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Abstract

Background: Randomized controlled trials are central to evidence-based management of peripheral neuropathy, but their clinical usefulness varies widely. Prior work in other specialties suggests that limited pragmatism, narrow eligibility criteria, and incomplete reporting may hinder translation into routine practice.

Methods: This meta-research study evaluated 192 English-language RCTs across diverse etiologies and global settings. Interventions included pharmacologic, rehabilitative, device-based, and complementary therapies. Two independent reviewers applied the 13-item framework to assess pragmatism, patient-centeredness, generalizability, and data-sharing practices. Descriptive and regression analyses identified trends and predictors of usefulness.

Results: Of 192 trials, 90.6% reported patient-centered outcomes, but only 3.6% featured pragmatic elements. Most relied on placebo comparators and single-center designs, with no cost-benefit analyses. Usefulness scores modestly improved over time ($r = 0.22$, $p = 0.003$), though generalizability and data-sharing remained limited.

Conclusion: Recent PN RCTs show slight improvement in clinical usefulness but remain constrained by narrow eligibility, low real-world relevance, and poor transparency. Future research should prioritize broader inclusion criteria, standardized outcomes, and FAIR-compliant data sharing to enhance impact and equity.

Keywords: Peripheral Neuropathy; Randomized Controlled Trials; Clinical Usefulness

Title: Effect of Cognitive Processing Therapy Compared to Prolonged Exposure Therapy in Military Personnel with PTSD on PTSD-Related Patient Reported Outcomes: A Critically Appraised Topic

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Abstract

Clinical Scenario: The prevalence of Post Traumatic Stress Disorder (PTSD) has been observed at twice the rate in military populations (14-16%) when compared to those within traditional populations (7-8%). Cognitive Processing Therapy (CPT) and Prolonged Exposure Therapy (PET) are two of the more common therapeutic approaches to PTSD by clinicians that display a successful return to daily life.

Clinical Question: In military populations current and post-service with PTSD, does CPT improve outcome scores to a greater degree than PET when measured on the Clinician Administered PTSD Scale (CAPS) and PTSD Checklist?

Summary of Key Findings: While CPT and PET proved successful in PTSD symptom reduction, neither showed a significant advantage over the other when assessed on the CAPS or PTSD Checklist.

Clinical Bottom Line: CPT and PET are both successful approaches to PTSD symptom reduction, and the choice of intervention between the two should come down to patient and clinician comfortability.

Strength of Recommendation: This CAT received a grade B on the SORT analysis as 2 of reviewed studies received a level 2 on the CEBM rating scale from 2011 and 1 received a level 3. According to the GRADE scale, there is moderate evidence to suggest that both CPT and PET are successful in the treatment of PTSD symptoms.

Keywords: Post-traumatic stress disorder, PTSD Checklist, Clinician Administered PTSD Scale

Title: Iron Deficiency Across the Lifespan: Disparities by Sociodemographics and Physical Activity in NHANES Data

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Introduction/Objectives:

Iron deficiency is associated with significant clinical health outcomes, including fatigue, cognitive impairment, and in severe cases, adverse pregnancy outcomes and impaired immune function. However, iron deficiency risk may vary substantially across subgroups, including age, socioeconomic status, and physical activity levels. Thus, our primary objective was to assess ferritin averages across age groups using NHANES data, specifically examining rates of iron deficiency status—stratified across these domains.

Methods: Using data from the National Health and Nutrition Examination Survey (NHANES), we conducted a cross-sectional study to assess deviations in iron-deficiency, using serum iron with sex-specific quartile ranges, among the US population. Stratification included age groups (18–24, 25–39, 40–59, and 60+), sex at birth, and days of completing 60 minutes of physical activity. Regression models and X^2 tests were used to measure significant differences between groups.

Results: Among a sample of 18,519 participants, an estimated 23.4% of US adults had low serum iron—slightly declined from 26.7% among those 18-24 to 21.6% for those 60 and over. By race/ethnicity, Black, Hispanic, and Other/Multiracial had the highest rates (P <.0001). Among all participants, no significant association was found between serum iron and the number of days of physical activity.

Conclusions: Our findings show that nearly 1 in 4 US residents had low serum iron, with certain groups having higher risks. Given the high prevalence, routine screening should be encouraged throughout the lifespan, and additional public health messaging is needed.

Keywords: Iron-deficiency, anemia, NHANES

Title: An Evaluation of the Transparency, Quality, and Readability of Artificial Intelligence Responses to Colonoscopy Frequently Asked Questions

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Abstract

Introduction/Objectives: With the increased integration of Artificial Intelligence (AI) into healthcare, it is important to understand how AI can be used to enhance the access of medical information to patients. Although AI is used to provide quick access to answers, there are concerns about its trustworthiness. This study's purpose is to evaluate AI's credibility, readability, and overall quality of the information for frequently asked questions (FAQs) from Google Gemini and ChatGPT for colonoscopies.

Methods: The 20 most FAQs with their answers were obtained from two AI platforms, Google Gemini and ChatGPT. Rothwell classification was used to categorize the FAQs into fact, policy, or value. The information sourced by the AI from the FAQs were then measured for credibility and transparency using the Journal of the American Medical Association's (JAMA) standards and the quality was scored using the Brief DISCERN Score. Understandability was scored using the Patient Education Materials Assessment Tool (PEMAT). Flesch Reading Ease (FRE) and Flesch-Kincaid Grade Level (FKGL) were used to score the readability of the FAQs' answers.

Results: Of the 40 responses, the most common question category determined by Rothwell classification was factual (17/40; 42.5%), while restrictions (5/40; 12.5%) and technical details (5/40; 12.5%) were the most common topics. ChatGPT had higher mean JAMA (3.0 ± 0.92) and DISCERN (32.0 ± 4.6) values compared to Google Gemini mean JAMA (1.45 ± 1.23) and DISCERN (21.4 ± 6.3). However, Google Gemini had a higher mean PEMAT (55.5% ± 25.1%) compared to ChatGPT mean PEMAT (51.7% ± 20.6%). Though academic websites were the most referenced websites (22/40, 55.0%), the commercial websites that the AI platforms referenced had the highest JAMA and DISCERN total mean scores (3.7 ± 0.6 and 32.0 ± 6.9, respectively). FRE scores were highest for questions related to facts for both ChatGPT and Google Gemini (43.7 ± 17.6 and 45.6 ± 15.4, respectively). Google Gemini had a lower overall FKGL (12.1 ± 2.9) compared to ChatGPT (12.4 ± 2.4).

Conclusions: AI-generated responses to colonoscopy FAQs vary in transparency, informational quality, and readability. ChatGPT demonstrated higher-quality and more transparent sourcing, whereas Google Gemini produced more readable and actionable content, highlighting a trade-off between depth and accessibility in AI-generated content. Clinicians and administrators should consider these differences and proactively engage patients in discussions about AI-sourced information to support informed, patient-centered decision-making. As AI tools become increasingly integrated into health information seeking, ongoing evaluation and standard-setting will be essential to ensure safe and effective patient education.

Title: Individualized muscle morphology and force calculations for the lower limb from MRI

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Abstract

Introduction: We produced a musculoskeletal model of the human lower limb for biomechanical simulation and improving outcomes for sports medicine and rehabilitation. One of our authors obtained high resolution MRI of their lower limb, through the StudentBody program for student-directed research.

Methods: Muscle models and forces: MRI was conducted at the OSU Biomedical Imaging Center. In Avizo we segmented muscle outlines every four transverse MRI slices with missing segments filled in by interpolation. When needed Meshmixer ensured smooth surfaces and closed volumes. In Meshlab we collected muscle volume for cross-sectional area (PCSA) and baseline mass, center of mass, and mass moments of inertia. We approximated PCSA with Meshlab-measured muscle volume, length, and literature-derived fascicle length percentages of muscle length and pennation angle. To calculate force, we multiplied PCSA by isometric stress (30 N/cm2). Mass properties: Thigh and leg mass properties were calculated by separately determining properties of constituent muscle, bone, and marrow+adipose, and aggregating these for respective segments through matrix operations. Foot mass properties were calculated from existing regressions. Total estimated mass was tested by weighing the subject's lower limb on a digital scale.

Results: We created surface models of muscles color coded separately for differentiation in respective compartments, and visualization through transparent volume renderings of all tissues. Force results: Thigh muscles with the greatest force in respective compartments were Gluteus Maximus (1,078 N), Vastus Intermedius (1,900 N), Adductor Magnus at (1,249 N), and Semimembranosus at 919 N. In the leg greatest forces were the Tibialis Anterior (332 N), Soleus (the peak force, 1,982 N), and Fibularis Longus (239 N). Mass properties: Measured mass of 14 kg converged with estimated mass of 13.2 kg. Bulk segmental volumes and densities approached measured mass closer than tissue-specific sums.

Discussion: Relatively low Gluteus Maximus force may be because its volume was not fully captured in the imaging. Although Vastus Intermedius has relatively the longest fascicles of the vastus muscles, its pennation angle brings its cosine the closest to 1. We anticipate that a full gluteal model will reduce mass discrepancy, and slightly shift thigh center of mass proximally and increase its mass moments of inertia.

Significance+future directions: Reading and modeling from MRIs vastly improved the skills we have of interpreting them, and differentiation between tissue types. Our MRI-based results will ground ultrasound-based tracking of muscle volume and force generation for rehabilitative patients and athletes.

Keywords: Segmentation; Muscle; Lower limb

Title: Closing the Gap: Clinical Utility and Transparency in Acute Psychosis Randomized Clinical Trials

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Abstract

Background: Clinicians managing acute psychosis face ongoing challenges due to limited data on patient-centered care, despite progress in antipsychotic pharmacotherapy and early intervention models. This study aims to determine the usefulness of clinical trials for acute psychosis in schizophrenia.

Methods: This study evaluated randomized controlled trials (RCTs) on interventions for acute psychosis in schizophrenia published between January 1, 2014 to December 31, 2024. We filtered MEDLINE and Embase to identify eligible studies, with results screened independently by two reviewers using Rayyan, followed by full-text review and reference screening. Eligibility included human RCTs targeting acute-phase interventions, excluding secondary reports, pilot studies, and non-randomized designs. Trial characteristics and usefulness data, per van 't Hooft et al., were extracted, with 13 criteria valued from 0 to 2, up to a total of 26. We used descriptive statistics for trial characteristics, linear regression to examine scores over time, and correlation analysis to analyze the relationship between core usefulness and transparency scores. All study materials, scripts, and data are publicly available via the Open Science Framework.

Results: Our search identified 967 unique records, with 32 RCTs ultimately included after screening and reference checks. Most studies were published in psychiatry journals (84%) between 2014–2024, primarily conducted in Asia (34%) and Europe (28%), with a median sample size of 106 participants. Assessment using a 13-item framework revealed that information gain (38%) and addressing an important clinical problem (34%) were the most frequently fulfilled clinical utility criteria, whereas patient-centeredness (16%) and value for money (0%) were rarely reported. Transparency was often limited: only 34% of studies were pre-registered, 6% provided protocols, and none shared raw data. Total usefulness showed a modest upward trend over the decade, and transparency was moderately positively correlated with clinical utility ($r = 0.37$, $p = 0.039$).

Conclusions: Reporting of pragmatism, patient-centeredness, and raw data—key to real-world relevance—remains limited, revealing gaps in clinical applicability. This study emphasizes the value of standardized assessments and reporting consistency to enhance the clinical impact of RCTs. The data exposes gaps in usefulness among acute psychosis in schizophrenia RCTs, particularly regarding pragmatism and patient-centeredness, and suggests that increased reporting may improve the overall reliability of trial findings.

Keywords: Schizophrenia; criteria; usefulness; transparency; psychosis

Title: Evaluation of Safety Reporting in Interventional Trials of Benign Prostatic Hyperplasia: A Registry-Publication Comparison Study

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Abstract

Purpose: To assess the concordance of adverse event reporting between clinical trial registries and their corresponding publications for interventions treating benign prostatic hyperplasia.

Materials and Methods: We conducted a registry-to-publication comparison study to evaluate the completeness and concordance of adverse event reporting in benign prostatic hyperplasia. Studies were identified via searches of ClinicalTrials.gov studies with results posted from September 2009 to December 2024. We identified corresponding publications via ClinicalTrials.gov, PubMed, Google Scholar, pharmaceutical company portals, and Cochrane reviews. Data extraction was performed independently and in duplicate by masked reviewers. A quantitative analysis used descriptive statistics, Bland-Altman plots, funnel plots, and regression to assess concordance and identify predictors of incomplete reporting. Due to the study's focus on concordance, traditional risk of bias assessment was not conducted, however robust systematic review methods were employed.

Results: Of 36 included benign prostatic hyperplasia trials, registry reporting of adverse events was more complete than in publications. Post-Final Rule, overall adverse events and death reporting improved in registries but declined or remained inconsistent in manuscripts. Over 70% of trials showed discrepancies in serious adverse events counts, with most publications underreporting events compared to ClinicalTrials.gov.

Conclusions: In benign prostatic hyperplasia trials, adverse event data were more complete in ClinicalTrials.gov than in corresponding publications. Serious harm reporting was inconsistent, and post–Final Rule improvements in registry data were not mirrored in print. These gaps risk distorting clinical interpretation and highlight the need for aligned reporting standards to ensure transparent, patient-relevant safety communication.

Registration: Registered on the Open Science Framework

Keywords: Adverse Event Reporting, ClinicalTrials.gov, Benign Prostatic Hyperplasia (BPH), Transparency, FDAAA Final Rule

Title: Clinical Outcomes of Dry Needling Compared to Manual Therapy for Upper Extremity Myofascial Pain in Adults. A Critically Appraised Topic

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Abstract

Clinical Scenario: Myofascial pain syndrome (MPS) frequently affects active adults, with upper trapezius trigger points causing pain, stiffness, and functional limitations. Traditional treatments like trigger point compression, myofascial release, and cold-spray stretching are common, while dry needling (DN) has recently emerged and directly addresses myofascial pain to reduce pain and improve function.

Clinical Question: In adults with upper extremity myofascial pain, does DN improve pain, range of motion, and functional performance more effectively than stretching or manual soft tissue interventions?

Summary of Findings: Four randomized controlled trials (RCTs) compared DN to manual therapy or stretching showed improvements in pain and function, with DN producing superior short-term results.

Clinical Bottom Line: DN is at least as effective and often more effective than stretching or manual soft tissue techniques for reducing pain and range of motion in upper trapezius myofascial pain.

Strength of Recommendation: Consistent Level II on CEBM evidence scale supports DN as a clinical treatment for MPS.

Keywords: Myofascial Pain, Dry Needling, Manual Therapy, Trigger Points, stretching, upper traps, manipulative therapy

Title: **Participant Representation in Adolescent Neuroimaging Substance Abuse Research: A Systematic Review**

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Abstract

Introduction/Objectives: Adolescent cannabis use continues to rise worldwide, creating concern about its influence on neurodevelopment during a sensitive maturational period. Neuroimaging research has become essential for understanding how cannabis exposure affects brain structure and function in youth. However, the existing literature varies substantially in both methodological approaches and population characteristics. This systematic review examines global neuroimaging findings to identify dominant research patterns and major gaps that limit generalizability.

Methods: A total of 166 peer-reviewed neuroimaging studies involving adolescent or young adult substance users were extracted. Key variables included the country in which each study was conducted, the substance group examined, participant age category, and the neuroimaging modality used. All articles underwent a double-blinded review and data-extraction process, in which two independent reviewers screened studies and extracted variables without knowledge of each other's classifications. Discrepancies were resolved through consensus. Extracted variables were compiled into a centralized dataset for descriptive analysis of global research representation and major neural systems implicated across studies.

Results: Cannabis was the most frequently studied substance (85 studies, 51%), followed next by mixed-substance groups (27 studies). Neuroimaging work relied primarily on functional MRI (45 studies) and structural MRI (20 studies). Across both modalities, findings most consistently involved changes in prefrontal regions and limbic or reward-related areas, indicating alterations to circuits responsible for emotion regulation and motivational processing. Geographically, research was concentrated in Western countries, with the United States contributing nearly half (75 of 166) of all studies. Age representation was also uneven; most studies focused on young adult samples, while substantially fewer targeted mid-adolescence, the developmental stage most sensitive to cannabis exposure.

Conclusions: Current neuroimaging evidence on adolescent cannabis use is shaped largely by Western research settings and by methodological reliance on functional and structural MRI. Although findings consistently highlight disruption in prefrontal and limbic systems, meaningful gaps remain, including limited geographic diversity and limited focus on early and mid-adolescent developmental stages. Broader sampling across regions and age ranges is needed to build a more complete understanding of cannabis-related neurodevelopmental risk.

Keywords: Adolescent cannabis use; Neurodevelopment; Neuroimaging; fMRI; Prefrontal cortex; Limbic system; Systematic review

Title: Brain Glycogen Phosphorylase (PYGB) characterized as a Potential Disease Linked Biomarker in HCV-Related Cirrhosis and Hepatocellular Carcinoma.

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Abstract

Introduction/Observation:
Chronic hepatitis C virus infection remains a major global cause of cirrhosis and hepatocellular carcinoma (HCC), emphasizing the need to define molecular pathways that contribute to liver disease progression. Glycogen metabolism is central to hepatic energy regulation, yet the enzymes driving glycogen mobilization in diseased tissue are not fully understood. Brain-type glycogen phosphorylase, PYGB, catalyzes the rate-limiting step of glycogen breakdown during metabolic stress. Although PYGL is traditionally considered the dominant hepatic isoform, growing evidence suggests a larger role for PYGB in liver pathology. PYGB overexpression has been reported in HCC and linked to tumor aggressiveness, poorer outcomes, and responsiveness to glycogen phosphorylase inhibition. Its upregulation across multiple solid tumors further supports its role in proliferation, metabolic adaptation, and invasive behavior. Despite this evidence, PYGB protein expression has not been systematically characterized across healthy, cirrhotic, and malignant liver tissues in HCV-related disease. This study evaluates PYGB expression using immunohistochemistry with quantitative image analysis and proteomic data.

Methods: Sixty-five liver tissues representing healthy controls, HCV-induced cirrhosis, and HCC were obtained from the NIH Liver Tissue Bank. DIA proteomics quantified 4,445 proteins, including PYGB, to explore biomarker candidates in HCV-related disease. PYGB expression was assessed using HRP-based immunohistochemistry with matched negative controls. Slides were imaged under a Nikon Ts2R inverted microscope at standardized conditions. Quantitative analysis in QuPath measured total detected cells, PYGB positive cells, by calculating the cytoplasmic DAB intensity using consistent thresholds to enable reproducible comparisons across tissues.

Results: PYGB immunostaining was consistently detected in all liver tissues and showed distinct cytoplasmic localization absent in negative controls. Quantitative image analysis demonstrated clear disease associated increases in PYGB expression. Across both males and females, HCV cirrhotic tissues displayed higher PYGB levels than their respective healthy controls, and PYGB remained elevated or further increased in hepatocellular carcinoma. These trends were observable in every sex stratified comparison, indicating that the upregulation of PYGB is driven primarily by disease status. Although individual variability was present within each category, the overall pattern showed a stepwise rise in PYGB expression from healthy liver to HCV induced injury and malignant transformation. This expression gradient is consistent with the proposed role of PYGB in supporting the heightened metabolic demands of chronically injured and cancerous liver tissue.

Conclusions: PYGB is readily detectable in human liver tissue and demonstrates distinct disease linked variation across healthy, cirrhotic, and HCC samples. These findings align with emerging evidence that PYGB contributes to metabolic alterations in liver pathology and support further investigation of PYGB as a potential disease linked biomarker in HCV-related cirrhosis and HCC. The results provide a foundation for future mechanistic studies on glycogen phosphorylase isoform regulation in chronic liver disease and malignant progression.

Title: USMLE Step 2 CK Score and Match Outcomes Across Specialties Among U.S. DO Students: a 2024 NRMP Charting Outcomes Analysis

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Abstract

Introduction/Objectives: Despite formal equivalency between the Comprehensive Osteopathic Medical Licensing Examination (COMLEX-USA) and the United States Medical Licensing Examination (USMLE), osteopathic medical (DO) applicants often elect to take USMLE Step 2 Clinical Knowledge (Step 2 CK) to enhance residency competitiveness. Prior studies and national residency survey data suggest that residency program directors rely heavily on USMLE scores for applicant comparison to obtain interviews, and that Step 2 CK remains a key screening metric. Consequently, many DO applicants pursue Step 2 CK as a strategic means to improve match outcomes. Therefore, objective, specialty-specific data are needed to determine whether a competitive Step 2 CK score meaningfully improves match success among DO applicants and to inform future applicants' decisions regarding Step 2 CK participation

Methods: We conducted a cross-sectional analysis of publicly available, aggregate-level data, extrapolated from the 2024 National Resident Matching Program (NRMP) *Charting Outcomes in the Match.* DO senior applicants across 20 specialties with reported Step 2 CK data were included. For each specialty, a "competitive" Step 2 CK threshold was defined as the midpoint between the mean scores of matched and unmatched applicants. Applicants were classified as having competitive or non-competitive scores, and exploratory logistic regression analyses were performed to estimate odds ratios for match success.

Results: In preliminary analyses of the 2024 anesthesiology application cycle, applicants with a Step 2 CK score ≥245 had significantly higher odds of matching compared with those scoring below this threshold (odds ratio [OR], 4.28; 95% CI, 2.34–7.82; $P < .001$).

Conclusions: A higher or competitive Step 2 CK score is associated with increased odds of matching, though the magnitude of this association varies by specialty. While we neither recommend nor discourage osteopathic medical students from taking Step 2 CK, the specialty-specific relationship between Step 2 CK performance and match outcomes should be considered alongside other unmeasured factors when making application decisions.

Keywords: USMLE Step 2 Clinical Knowledge Score; Medical Education; Residency Match

Title: **Microglia immunoreactivity in the mPFC of rats exposed to xylazine-adulterated heroin.**

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Abstract

Introduction/Objectives: The medial prefrontal cortex (mPFC) plays a critical role in executive function and emotional regulation and is highly vulnerable to disruption following repeated drug exposure. Microglia, the resident immune cells of the brain, respond to harmful stimuli through morphological changes and increased expression of ionized calcium-binding adapter molecule-1 (IBA1), contributing to neuroinflammation and altered neural signaling. Recently, heroin adulterated with xylazine, a veterinary α2-adrenergic agonist, has become increasingly prevalent, yet its effects on neuroimmune responses remain poorly understood. This study aimed to assess microglial activation in the mPFC following exposure to xylazine-adulterated heroin.

Methods: Adult male Sprague–Dawley rats (250–275 g) were housed individually under a reverse 12-hour light/dark cycle with ad libitum access to food and water. Animals were surgically implanted with jugular vein catheters and assigned to one of four groups: saline, heroin (0.02 mg/kg/infusion), xylazine (0.15 mg/kg/infusion), or heroin plus xylazine. Rats self-administered their assigned solutions for 2 hours per day over 10 consecutive days. Following the final session, animals were euthanized, and brains were collected for immunofluorescent staining of microglia using IBA1 and Alexa Fluor 488. Data were analyzed using one-way ANOVA with Tukey's post hoc test.

Results: IBA1 immunoreactivity was significantly increased in the heroin, xylazine, and co-administration groups compared to saline treated controls; however, no statistically significant differences were detected among the drug-treated groups. Representative immunofluorescent images revealed a shift from ramified microglia in saline-treated animals to an activated morphology in drug-treated groups.

Conclusions: Xylazine adulteration inflicts comparable inflammatory activation when compared to heroin alone, indicating that the inflammatory conditions are sustained with adulteration. Future studies will reveal how this sustained inflammation can modulate behavioral outcomes.

Keywords: xylazine, heroin, microglia, medial prefrontal cortex, neuroinflammation

Title: Persistent Post–COVID-19 Stridor in an Adolescent Female Treated with Botulinum Toxin

Authors: *M Kashef; M Lamb; A Hashim Ali; GP Digoy*

Abstract

Background: Persistent stridor following COVID-19 infection is rare, particularly in adolescents without prior airway trauma or intubation. Post-viral laryngeal dysfunction has been described, but sustained inspiratory stridor requiring repeated intervention remains poorly characterized.

Case Presentation: A previously healthy 17-year-old female developed persistent inspiratory stridor three days after a mild COVID-19 infection. Symptoms progressed rapidly, requiring ICU-level care. Initial management with racemic epinephrine, heliox, corticosteroids, and speech therapy failed to improve symptoms, which persisted at rest and during sleep. Flexible laryngoscopy demonstrated paradoxical vocal cord motion with intermittent adductor spasms and no evidence of fixed paralysis or structural abnormality. Given the severity and persistence of symptoms, the patient underwent bilateral botulinum toxin injections to the adductor muscles of the larynx.

Discussion: The patient experienced significant symptomatic improvement following botulinum toxin therapy. Over a 12-month period, she received a total of five injections, each providing sustained relief with progressively longer symptom-free intervals. No tracheostomy or intubation was required. Transient dysphonia and mild aspiration occurred after several injections but resolved without intervention. Clinical improvement preceded initiation of psychiatric therapy, suggesting a neuromuscular rather than purely psychogenic etiology.

Keywords: COVID-19; persistent stridor; vocal cord dysfunction; botulinum toxin; paradoxical vocal fold motion

Title: Efflux Responses in *Serratia marcescens* after Triclosan Treatment

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Abstract

Introduction/Objectives: Nosocomial pathogens *Pseudomonas aeruginosa* and *Serratia marcescens* resist cytoplasmic entry of the biocide triclosan, which in *P. aeruginosa* inhibits membrane fatty acid biosynthesis by interacting with FabI. The outer membrane permeabilizer compound 48/80 sensitizes both bacteria to triclosan. Multidrug efflux pump activity and induction of triclosan-resistant FabV allow *P. aeruginosa* recovery. *S. marcescens* ATCC 13880 is similarly sensitized, but with a faster recovery, and the genome reveals FabV but not FabI genes. RNA-sequencing (RNA-seq) of *S. marcescens* indicated over 700 genes were upregulated following triclosan and/or compound 48/80 exposure. To examine the *S. marcescens* response, efflux pump gene expression was tracked using Reverse Transcription-Quantitative PCR (RT-qPCR) via a time course.

Methods: *S. marcescens* ATCC 13880 samples included cells exposed to triclosan and/or compound 48/80 and controls. Total RNA was prepared for use in RT-qPCR. RNA-seq results guided the selection of atpB and ybhY as housekeeping genes. Analysis and correlation of RT-qPCR data was by Applied Biosystem's Expression Suite Software V 1.3.

Results: The *S. marcescens* ATCC 13880 genome has seven efflux pump groups. Genes from three were not induced and not RT-qPCR tested (proteobacterial antimicrobial compound efflux group , multi-antimicrobial extrusion gene and aminobenzoyl-glutamate transport gene - PACE, MATE and abgT respectively). One of the four efflux groups with genes upregulated in RNA-seq had an mRNA concentration too low for qPCR detection (the small multidrug resistance group [SMR] gene ssmE).

Compound 48/80 significantly induced both macA, of the ATP-binding cassette (ABC) efflux group and smfY, of the major facilitator superfamily (MFS) efflux group. Triclosan & compound 48/80 treatment induced MFS group members smfY and emrB/qacA.

Resistance nodulation-division (RND) efflux genes mexA/sdeP, acrB/sdeY and the related genes acrZ_1 and acrZ_2 (*Serratia*-unique) were all found to be induced with triclosan & compound 48/80 but the cycle threshold (Ct) value range for mexA/sdeP was high (27-30) indicating low cDNA concentration. AcrB/sdeY was found to be constitutively expressed.

Conclusions: Without permeabilization triclosan cannot penetrate *S. marcescens* outer membrane. With FabV and no FabI, cytoplasmic triclosan in *S. marcescens* cannot inhibit fatty acid metabolism. RNA-seq and RT-qPCR results indicate PACE, MATE, abgT and SMR efflux pumps are not involved in the response, while the ABC group response is primarily to compound 48/80 damage. The MFS gene smfY was induced by both compound 48/80 alone and triclosan & compound 48/80 together. *S. marcescens* genes induced by both compound 48/80 alone and by triclosan & compound 48/80 dual treatment indicate that

acrB/sdeY efflux genes respond to compound 48/80 outer membrane damage. The major efflux response is by RND genes acrB/sdeY, and both acrZ genes, different from the primary mexA response in *P. aeruginosa*. The second copy of RND gene acrZ is present in most species of the genus *Serratia*, while all other Enterobacteriaceae possess only one copy of acrZ, and Pseudomonadaceae have none. AcrZ interacts with acrB/sdeY and is thought to modulate efflux activity. This work introduces this second acrZ gene and demonstrates that both versions are active and inducible.

Title: Source Reliability of Artificial Intelligence Responses to FAQs of Pregnancy: A Cross-Sectional Evaluation

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Abstract

Introduction: Many pregnant patients now use the internet and artificial intelligence (AI) platforms as their reliable resource for medical knowledge. With the increased usage and availability of artificial intelligence via ChatGPT and Google, it has become much more critical to verify and compare pregnancy-related frequently asked questions (FAQs) to assess quality and usefulness. This study aims to evaluate the FAQs and quality of resources presented by AI platforms such as ChatGPT and Google Gemini for pregnancy.

Methods: The top 20 FAQs with respective answers and sources for pregnancy were obtained on ChatGPT and Google Gemini. FAQs were classified using the Rothwell classification. FAQ answer source information transparency was scored using the Journal of the American Medical Association's (JAMA) benchmark criteria, and the quality was analyzed using the Brief DISCERN score. Understandability and actionability for patients were assessed using the Patient Education Materials Assessment Tool (PEMAT). The readability of FAQ answer sources was scored using the Flesch Kincaid Grade Level (FKGL) and Flesch Reading Ease (FRE) formulas.

Results: Academic sources were the predominant reference presented by both ChatGPT (60%; 12/20) and Gemini (65%; 13/20). However, only 25% (5/20) of all references from Gemini were active and accessible webpages. The most common Rothwell classification was "Fact" for both ChatGPT (70%) and Gemini (75%). Total PEMAT scores were similar between ChatGPT (53.9%) and Gemini (53.2%), although ChatGPT had a greater mean JAMA score (2.05) and total DISCERN score (22.00) compared to Gemini (1.45 and 16.67, respectively). The average FRE and FKGL scores were 37.5 and 11.4 for ChatGPT and 39.5 and 12.6 for Gemini.

Conclusion: This study found that both ChatGPT and Gemini predominantly referenced academic sources when responding to pregnancy-related FAQs; however, meaningful differences can be observed in the quality and transparency of information. Considering these differences, patients should be cautious when referencing AI search engines for pregnancy-related information. With careful oversight of FAQs of pregnancy and their generated responses, patients can make more informed decisions that enhance their medical care.

Keywords: Artificial Intelligence, Pregnancy, Patient Education

Title: **The Association of Food Security on Mental Health in Perinatal Mothers**

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Abstract

Background: In 2023, 13.5% of American households, or over 40 million people, were estimated to be food insecure. Among subpopulations, food insecurity may likely have the most consequential effects on pregnant women—including their physical and mental health. However, significant gaps remain in this area of research; therefore, our primary objective was to assess the prevalence of food insecurity among these women and its association with diagnoses of depressive disorders and frequent poor mental health days.

Methods: We conducted a secondary analysis of the 2023 Behavioral Risk Factor Surveillance System to estimate the breadth of food insecurity among pregnant women in the United States and its impact on depressive disorders and experiences of frequent poor mental health days (14+ days in the past 30). We used design-based X^2 tests and regression models to measure associations.

Results: Among a sample of 1,078 pregnant women meeting inclusion criteria, 33.3% reported experiencing food insecurity. Preliminary binary analysis showed no significant association between food insecurity and depression diagnoses but did among frequent poor mental health days ($P = .024$) in addition to frequent poor physical health ($P < .0001$) and poorer self-reported health status ($P<.0001$).

Conclusions: Our findings showed nearly 1 in 3 pregnant women in the United States (over 320,000 annually) experienced food insecurity in 2023—which was significantly associated with poorer ratings of physical and mental health. Inadequate nutrition may significantly affect fetal development, in addition to the increased stress that the woman encounters during pregnancy. This may be a critical indicator for clinicians to assess during prenatal care—with significant health policy implications.

Keywords: Food security, Pregnancy, Depression

Title: **Outcome Modification and Disclosure Practices in Sinonasal Clinical Trials: A Registry-Based Cross-Sectional Analysis**

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Abstract

Introduction/Objectives: Clear prespecification and transparent reporting of trial outcomes are essential for valid interpretation of treatment effects. Although selective outcome reporting has been documented across many medical specialties, outcome modification practices in sinonasal clinical trials have not been systematically examined. We aimed to characterize the frequency, type, timing, and disclosure of outcome modifications in interventional trials for inflammatory sinonasal disease registered on ClinicalTrials.gov and reported in the peer-reviewed literature.

Methods: We conducted a registry-based cross-sectional analysis of interventional phase 2–4 sinonasal trials with posted results and an associated primary publication. Original and most recent ClinicalTrials.gov entries were compared using registry version histories to identify outcome modifications. Changes were classified as high-, moderate-, or low-impact based on their potential effect on outcome interpretation. Disclosure of modifications was assessed in ClinicalTrials.gov records and corresponding publications. Descriptive statistics summarized trial characteristics and modification patterns, and Firth penalized logistic regression was used to explore factors associated with outcome modification.

Results: Seventy-two trials met inclusion criteria. Substantive outcome modifications occurred in 94.4% of trials, with a median of seven modifications per trial. High-impact modifications affecting primary outcomes were present in 58.3% of trials. Modifications most commonly involved outcome clarification, timing changes, and complete redefinitions. All substantive modifications were recorded after primary completion or publication. Disclosure was uncommon: 4.4% of trials disclosed modifications in the registry, 1.5% in publications, and 5.9% in either source. Trials completed after implementation of the FDAAA Final Rule and those prespecifying more than three outcomes had lower odds of high-impact modification.

Conclusions: Outcome modifications were widespread in sinonasal clinical trials, yet disclosure in registries and publications was rare. Although many changes may reflect legitimate refinement of evolving outcome measures, limited transparency undermines interpretability and confidence in reported findings. Strengthening documentation and disclosure of outcome changes is needed to improve the clarity and credibility of evidence in sinonasal research.

Title: LEAN Methodology Used to Evaluate of the Sign-and-Held Order Process at a Mid-Sized Hospital

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Abstract

Background: In a hospital, there are many different phases of patient care which work independently regarding electronic medical records workflow. Ideally, when transferring patients from one area of care to another, providers can place orders that are held in the initial area of care and then are completed once the patient arrives at the receiving area. This process is called Signed and Held Orders. At a mid-sized urban hospital, variability in the sign-and-held (S&H) order process contributed to delays in patient care. Delayed patient care can be detrimental to the patient's health outcome and delay other hospital operations. Therefore, a team was tasked with learning and implementing LEAN based methodology to find the root of the problem, streamline the process, and present solutions to the hospital's administration

Methods: LEAN is a systems-based practice quality improvement methodology which seeks to optimize systems through increasing efficiency and decreasing waste. After completing LEAN training, eight medical students investigated the S&H order processes through interviewing staff and observing its processes spanning the different phases of care within the hospital. The team mapped the S&H order process and identified root causes of delays. After brainstorming solutions and assessing them according to a cost/benefit matrix, the team identified solution recommendations and provided best options to the hospital administrators and staff for them to analyze and implement solutions. The entire training, investigation and recommendation process took 4 weeks.

Results: The team noticed significant inefficiencies in the S&H order process. Delays of 2-4 hours were common, and the physicians interviewed reported releasing their own S&H orders 30-50% of the time which is a deviation from protocol that created workflow inconsistencies. Nurses accessed their S&H orders through multiple methods in the electronic medical record (EMR), with many preferring their personal ways over what was taught in training. Varying methods indicated a root cause was a lack of standardization. Experienced new hires and contract workers were allowed to test-out of an *Epic* EMR course that covered S&H protocol, identifying why standardization lacked. Most units also lacked protocol, contributing to knowledge gaps. Overall, variability within Epic and limited standardization of the S&H orders increased the risk for delayed care and patient safety events. Results from the team's recommendations and subsequent solution implementation were beyond the scope of this study. To date, EMR workflow updates, standardized protocols, and structured staff education has been implemented to improve the management of S&H orders, with additional improvements currently in progress.

Conclusions: Electronic Medical Record use of Sign and Held Orders are tools used to increase the transfer of patients between units of the hospital. However, the absence of standard protocols and variance when releasing and fulfilling these orders in different units of the hospital caused inaccuracies and delays in care. The LEAN project identified root causes and potential, low-cost solutions for developing a streamlined, standardized protocol to ensure clear and efficient use of the Sign and Held order EMR function.

Title: Bridging Evidence in Practice: A Systematic Review of Usefulness in Randomized Controlled Trials of Laparoscopic Techniques in General Surgery Published 2020 to 2024

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Abstract

Introduction/Objectives: Laparoscopic surgery is widely used across numerous surgical specialties, offering benefits such as reduced postoperative pain and faster recovery. Although the number of randomized controlled trials (RCTs) in this field has grown substantially, many may lack features that enhance their clinical usefulness and real-world applicability. To evaluate the clinical usefulness and transparency of RCTs investigating laparoscopic surgery within the scope of general surgery, published between 2020 and 2024, using a structured framework developed by van ’t Hooft et al.

Methods: We systematically evaluated RCTs investigating laparoscopic surgical interventions in the field of general surgery. Eligible studies were identified using a comprehensive database search from both MEDLINE and Embase on May 19, 2025. Records were screened in duplicate and assessed using a 13-item usefulness framework. Data extraction was performed independently and in duplicate by trained reviewers. Descriptive statistics and linear regression analyses were used to summarize trial characteristics, and identify predictors of clinical utility, transparency, and total usefulness. Risk of bias assessment was not performed due to the unavailability of the planned tool (RobotReviewer).

Results: Among 161 included RCTs, clinical utility was inconsistently reported: patient-centeredness (64.0%) and feasibility (59.6%) were more commonly reported, while problem base (6.8%) and pragmatism (0.6%) were infrequent. Transparency was also low, with only 3.1% of studies sharing raw data. Greater transparency was significantly associated with higher clinical utility, with a low to moderate positive correlation ($r = 0.31$, $p < .001$). Regression models identified general surgery journals, self-funding, and higher journal impact factor as predictors of greater overall usefulness.

Conclusions: Despite growth in laparoscopic surgery trials, many remain limited in transparency, pragmatism, and relevance to real-world clinical problems. Addressing these gaps may improve the applicability of trial findings to routine surgical practice.

Keywords: Laparoscopic surgery; Randomized Controlled Trials; General Surgery; Clinical Applicability; van ‘t Hooft, Pragmatic Trials; Feasibility; Real-world Evidence, Patient-centered Outcomes; Data Sharing; Research Transparency

Title: **The Effect of Neurodynamic Mobilization Exercises on Range of Motion, Pain, and Disability when added to Standard Treatment of Patients with Cervical Radiculopathy: A Critically Appraised Topic**

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Abstract

Clinical Scenario: Cervical Radiculopathy occurs when the nerve roots that exit the cervical spine are compressed. This can cause pain, increased disability, and decreased cervical range of motion. A technique used in the treatment of neurological symptoms is neurodynamic mobilization, also known as nerve glides. The objective of this research was to determine whether nerve glide techniques could improve the treatment of neurological symptoms associated with cervical radiculopathy.

Clinical Question: In patients with cervical radiculopathy, does adding neurodynamic mobilizations to standard treatment protocols improve outcomes of pain, disability, and ROM?

Summary of Findings: Participants receiving neurodynamic mobilizations for cervical radiculopathy treatment demonstrated improvements in pain, cervical disability, and cervical range of motion.

Clinical Bottom Line: Neurodynamic mobilization, when combined with other conservative treatments, is a highly effective intervention for reducing pain, improving function, and increasing cervical range of motion in patients with cervical radiculopathy.

Strength of Recommendation: Consistent CEBM level II findings, as well as “good” PEDro score articles, support adding neurodynamic mobilizations in the treatment of cervical radiculopathy.

Keywords: Neural mobilization, Nerve glides, Neck pain, Cervical disability, Manual therapy

Title: A 50-State Comparative Analysis of Advance Directive Forms: Implications for Perioperative and Emergent Surgical Decision-Making

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Abstract

Introduction/Objectives: Advance directives are frequently activated in perioperative and emergent surgical settings, where patients may rapidly lose decisional capacity and high-stakes operative decisions must be made under time constraints. Although advance directives are governed by state law, surgeons often encounter them as if they represent a uniform consent instrument. Advance directive forms vary substantially across U.S. jurisdictions in execution requirements, language clarity, and autonomy-supporting provisions. This study aimed to systematically compare advance directive forms across all 50 U.S. states, the District of Columbia, and Puerto Rico, with particular relevance to surgical consent continuity, escalation of care, and intraoperative decision-making.

Methods: Official state-issued advance directive forms were obtained from the AARP State Advance Directive Forms Database in November 2025. Two reviewers independently extracted 20 predefined variables using a standardized instrument. Variables were grouped into three domains relevant to surgical practice: Execution Requirements, Language Clarity, and Autonomy Features. Domain scores were rescaled to composite indices ranging from 0 to 10. Regional differences were assessed using Fisher's exact tests and Kruskal-Wallis tests with Benjamini-Hochberg adjustment. Hierarchical cluster analysis was performed to identify jurisdictions with structurally similar advance directive forms that surgeons may encounter across practice settings.

Results: Substantial heterogeneity was observed across all three domains. Execution Requirements raw scores ranged from 6 to 13, reflecting wide variation in witness, notary, and procedural constraints that may affect the validity of directives during emergent surgical care. Language Clarity scores ranged from 1 to 5, indicating differences in interpretability during time-sensitive operative decision-making. Autonomy Features scores ranged from 3 to 8, with marked variation in provisions such as immediate agent authority, artificial nutrition preferences, and escalation-of-care options. No statistically significant regional differences in composite indices were observed after adjustment for multiple comparisons. Cluster analysis identified recurring structural design patterns that did not correspond to geographic regions.

Conclusions: Advance directive forms vary widely across U.S. jurisdictions in ways that are directly relevant to perioperative consent, emergent surgical decision-making, and postoperative escalation of care. Despite observable regional patterns, formal execution requirements and autonomy-supporting features are not regionally uniform, and structurally similar forms occur across disparate states. Awareness of this heterogeneity is important for surgeons who rely on advance directives during high-acuity clinical scenarios. This descriptive framework provides a foundation for future research evaluating how advance directive form design may influence surgical workflow, decisional conflict, and patient-centered operative outcomes.

Title: Feasibility of Brief Sleep Screening in Primary Care: A Quality Improvement Project

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Abstract

Background: Sleep difficulties affect a significant number of U.S. adults, making sleep a public health priority. However, clinical screening for sleep problems is uncommon, particularly in primary care.

Methods: This quality improvement project assessed the feasibility of screening adult primary care patients for sleep habits and perceived sleep difficulty during a 4-week medical student rotation. Under the direction of Family Medicine resident physicians, the student screened patients using an internally developed instrument. Screening time, documentation of results, and resident participation were tracked.

Results: Of the 10 residents the medical student worked with, eight permitted screening, with half documenting results in the patient note. On average, screening took about 5 minutes. All 23 patients invited to participate consented, with many reporting sleep problems.

Conclusion: This study demonstrates that sleep screening may be feasible during primary care visits without disrupting workflow. Patient outcomes indicate the need for such screening, while resident engagement suggests that most providers may be willing to screen for sleep issues. This project contributes to the growing emphasis on sleep as a public health priority.

Keywords: Sleep hygiene, sleep problems, quality improvement, sleep quality screening, public health, medical education

Title: Characterization of a *Talaromyces purpureogenus* Strain with Antimicrobial Activity

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Abstract

Introduction: Fungi are potential sources for antimicrobial agents, with penicillin being the first described secondary metabolite with potent antibacterial activity. This advancement dramatically transformed the field of medicine and saved many lives. Unfortunately, many bacteria and fungi have become resistant to the current arsenal of antimicrobial medications and the need for novel antimicrobials is urgent. In this study we have isolated a strain of *Talaromyces purpureogenus* and have begun to characterize its antimicrobial properties. *Talaromyces* fungi have been recognized as producers of bioactive metabolites with antimicrobial, anticancer, and antioxidant functions.

Materials and Methodology: Originally, the *Talaromyces purpureogenus* strain was found as a contaminant on a Sabouraud Dextrose Agar plate co-culture of *Bacillus subtilis* and *Candida albicans*. It exhibited a distinct red staining of the agar and inhibition of *B. subtilis* and *C. albicans.* Internal Transcribed Spacer (ITS) sequencing was used to identify the isolated fungus. Growth challenge studies were performed between *T. purpureogenus* and *B. subtilis, C. albicans, Lactobacillus* spp.*,* and the mucormycete *Rhizomucor pusillus*. Culture supernatants of *T. purpureogenus* were used in disk diffusion susceptibility tests with *C. albicans,* the aforementioned bacteria as well as *Escherichia coli, Staphylococcus aureus,* and *Pseudomonas aeruginosa*. Growth kinetic assay with liquid cultures of *S. aureus* and *P. aeruginosa* treated with *T. purpureogenus* supernatant were also performed. Conversely, liquid cultures of *T. purpureogenus* were exposed to aliquots of bacterial and fungal supernatants to evaluate the response of *T. purpureogenus* by sodium dodecyl sulfate–polyacrylamide gel electrophoresis (SDS-PAGE) of secreted proteins. Induced *T. purpureogenus* protein bands unique to individual supernatants were excised and analyzed by mass spectrometry. The *T. purpureogenus* supernatant was further separated by Reverse Phase-High Performance Liquid Chromatography (HPLC) and fractions were collected and evaluated for antimicrobial activity by disk diffusion susceptibility tests.

Results: Sequencing of the ITS PCR amplicons revealed sequence identity with *T. purpureogenus* database entries. Our isolate's morphology and the secretion of a red water-soluble dye are consistent with published literature on this fungus. Challenge studies and susceptibility tests reveal that *T. purpureogenus* inhibits the growth of *B. subtilis, S. aureus,* and *C. albicans*. Kinetic data indicate altered growth curves for *S. aureus* and *P. aeruginosa*. A distinct, induced band was observed on SDS-PAGE plates of liquid culture supernatant of *T. purpureogenus* cultivated in the presence of *S. aureus* supernatant and mass spectrometry analysis revealed it as a putative α-amylase enzyme.

Conclusion and Discussion: Although our results show clear inhibition of *some* of the tested bacteria and fungi, it is essential that additional challenge studies and extraction of potential antimicrobial substances be performed. We are working on optimization of the HPLC purification and antimicrobial susceptibility testing. Fractions with antimicrobial potential will be further characterized by SDS-PAGE and mass spectrometry. Further expression analyses of the α-amylase enzyme are being conducted. If specific *T. purpureogenus* proteins, peptides or other substances are confirmed with antimicrobial activity, they could be important leads for the development of novel antimicrobials, addressing the growing concern with antimicrobial resistance.

Title: Evaluating the Completeness of Safety Reporting in HIV/AIDS Clinical Trials: A Comparison of Registry and Publication Data

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Abstract

Introduction/Objectives: Safety reporting in clinical trials guides treatment decisions and best clinical practice, yet adverse events (AEs) are frequently described using inconsistent language and interpretation. Although registries such as ClinicalTrials.gov provide structured AE data, peer-reviewed publications remain the primary source of safety information for clinicians. Discrepancies between these sources may compromise the integrity and reliability of safety reporting. The objective of this study was to evaluate the agreement and completeness of AE data between ClinicalTrials.gov and corresponding publications for HIV/AIDS clinical trials and to examine the impact of the FDA Amendments Act Final Rule on AE reporting practices.

Methods: We conducted a systematic review of HIV/AIDS trials registered on ClinicalTrials.gov that were initiated between 2009 and 2024 and subsequently published. Registry and publication data were extracted and compared for reporting of serious adverse events (SAEs), other adverse events, treatment discontinuations, and mortality. Descriptive statistics and graphical analyses were used to characterize reporting patterns, and regression analyses were performed to evaluate the association between the FDA Final Rule and AE reporting completeness while controlling for trial size, funding source, and intervention type.

Results: A total of 129 eligible trials were included. Eighty-nine percent of trials demonstrated discrepancies between registry and publication data with respect to SAEs. In most cases, ClinicalTrials.gov reported more complete and detailed AE information than the corresponding publications, even after implementation of the FDA Final Rule. Regression analyses showed that implementation of the Final Rule was associated with a significant increase in AE reporting scores ($p < 0.001$), whereas trial size, funding source, and intervention type were not significantly associated with reporting completeness.

Conclusions: Substantial gaps persist between adverse event reporting in ClinicalTrials.gov and peer-reviewed publications for HIV/AIDS clinical trials. Despite regulatory efforts through the FDA Final Rule, publications continue to omit or selectively report AE data, potentially undermining the integrity, reproducibility, and clinical applicability of research findings. Ongoing reforms in AE reporting standards are necessary to support high-quality evidence and ensure patient safety in clinical practice.

Keywords: adverse events, HIV/AIDS, ClinicalTrials.gov, FDA Amendments Act, clinical trial reporting

Title: Transparency, Quality, and Source Accessibility of AI-Generated Hypertension Information: A Cross-Sectional Evaluation of ChatGPT and Google Gemini

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Abstract

Introduction: Patients increasingly rely on artificial intelligence (AI)-generated information when seeking guidance about chronic diseases such as hypertension. Despite widespread use, the transparency, informational quality, patient-centeredness, and source accessibility of AI-generated hypertension-related content remain incompletely understood. The objectives of the study are to evaluate AI-generated responses to common hypertension questions and assess the validity of their cited sources.

Methods: We conducted a cross-sectional analysis of hypertension-related frequently asked questions (FAQs) generated by ChatGPT and Google Gemini. Each model generated 20 FAQs with corresponding answers and cited website sources, yielding 40 FAQ-answer-URL triads. FAQs were classified by question intent using Rothwell's classification, and referenced websites were categorized by source type. Transparency was assessed using the Journal of the American Medical Association (JAMA) benchmark criteria, informational quality using the Brief DISCERN instrument, and patient-centeredness using the Patient Education Materials Assessment Tool (PEMAT). Readability was measured using Flesch-Kincaid Grade Level (FKGL) and Flesch Reading Ease (FRE) scores. Source accessibility was verified by attempting to access all cited URLs.

Results: Across both AI models, most hypertension-related FAQs addressed factual topics (20/40, 50.0%), with fewer policy-oriented questions (16/40, 40.0%) and value-based questions (4/40, 10.0%). Commercial websites were cited most frequently (18/40, 45.0%), followed by academic (12/40, 30.0%) and government sources (10/40, 25.0%). Nearly half of all cited URLs were inactive or inaccessible (18/40, 45.0%), with commercial sources accounting for the majority of inactive links (11/18, 61.0%). Transparency and informational quality scores were moderate overall and varied by question type. PEMAT understandability scores were consistently higher than actionability scores across both models. AI-generated responses exceeded recommended readability thresholds, with ChatGPT responses written at greater than 14th-grade level and Gemini responses averaging near 11th-grade level.

Discussion: AI-generated hypertension information demonstrates important limitations in transparency, actionability, source accessibility, and readability. The high prevalence of inactive citations, particularly from commercial sources, undermines the verifiability of AI-generated content and may erode patient trust. Both models produced content above recommended reading levels for patient education, potentially limiting accessibility for patients with limited health literacy. While AI tools may support general understanding of hypertension, their limited actionable guidance and citation reliability suggest they should not serve as standalone educational resources. Clinicians should proactively address information gaps during patient encounters, and AI developers should prioritize source verification, plain language communication, and actionable guidance to better serve diverse patient populations.

Title: **Undisclosed Outcome Modifications in Type 1 Diabetes Mellitus Clinical Trials**

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Abstract

Introduction/Objectives: The purpose of this study was to examine the frequency, type, and timing of prespecified outcome modifications in clinical trials for type 1 diabetes mellitus (T1DM) and to determine if these changes were acknowledged and rationalized in corresponding publications. This research is essential because undisclosed modifications can introduce bias and undermine the credibility of the evidence base used to guide treatment recommendations in T1DM care.

Methods: A registry-based cross-sectional analysis was conducted on T1DM interventional trials registered on ClinicalTrials.gov with start dates between January 18, 2017, and December 31, 2024. We compared each trial's earliest and most recent registry entries to identify outcome modifications, including additions, removals, and reclassifications. Corresponding peer-reviewed publications were reviewed to assess whether trialists provided a rationale for any modifications. A Severity-Weighted Change Score was used to quantify the impact of modifications.

Results: Of the 76 trials analyzed, every study (100%) had at least one outcome change. The majority of these changes occurred either post-publication (52.6%) or after the primary completion date (43.4%). The impact of these changes was predominantly rated as high (39.5%) or moderate (43.4%). Despite the prevalence of these modifications, none were reported on ClinicalTrials.gov, and only 13.2% (10/76) were acknowledged in the corresponding publications.

Conclusions: Our findings reveal a widespread issue of undisclosed outcome modifications in T1DM clinical trials, which may compromise the reliability of the evidence base that clinicians and patients rely on. The high frequency of changes, their substantial impact, and the lack of transparency in reporting raise concerns about interpretive bias and the credibility of trial findings. This persistent lack of disclosure undermines the regulatory standards intended to promote transparency and accountability.

Keywords: Type 1 diabetes mellitus; outcome switching; selective outcome reporting; clinical trial transparency; trial registration; ClinicalTrials.gov

Title: **Responsible AI in Rheumatology Research: Transparency and Guidance Across Leading Journals**

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Abstract

Introduction/Objectives: Artificial intelligence (AI) is becoming increasingly embedded in biomedical research, including rheumatology, where it can aid in tasks ranging from data analysis to manuscript preparation. With growing use, concerns have emerged about the transparency, accountability, and ethical standards of AI use. While organizations such as the International Committee of Medical Journal Editors have issued general AI guidelines, the extent to which rheumatology journals have adopted or operationalized such policies remains unclear. The objective of this study is to evaluate the presence, scope, and consistency of AI-related policies within the author guidelines of leading rheumatology journals.

Methods: We conducted a cross-sectional review of manuscript submission guidelines for rheumatology journals ranked in the 2023 SCImago Journal Rankings. Instructions for Authors webpages were independently reviewed in duplicate to extract information regarding AI authorship, disclosure requirements, AI-assisted writing, AI-generated content, and image generation. Journals without explicit AI statements were contacted through standardized editorial outreach. Descriptive statistics summarized policy characteristics, and exploratory correlational analyses assessed associations between journal characteristics (impact factor, SCImago rank) and AI policy adoption.

Results: Of 71 journals screened, 63 met inclusion criteria. Two-thirds (66.7%) referenced AI in their author guidelines, while 33.3% did not. Among journals referencing AI, all explicitly prohibited AI authorship, and most required disclosure of AI use (92.9%) and permitted AI-assisted manuscript writing (88.1%). Fewer journals addressed AI-generated content (47.6%) or image generation (50.0%). Endorsement of established AI-specific reporting guidelines was rare. Journal impact factor and SCImago rank were not meaningfully associated with the presence or scope of AI policies.

Conclusions: Rheumatology journals demonstrate heterogeneity and incomplete adoption of policies governing AI use. While consensus exists regarding disclosure and authorship restrictions, guidance on other aspects of AI-assisted research remains limited. Standardized, comprehensive AI policies may help support transparency, consistency, and methodological rigor as AI integration increases in rheumatology research.

Title: The Oncogenic Role of *Prevotella intermedia* in Oral Squamous Cell Carcinoma Progression

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Abstract

Introduction/Objectives:

Oral squamous cell carcinoma (OSCC) is a devastating cancer and a major public health problem throughout the world, comprising more than 90% of oral cancers, and the 5-year survival rate over the past several decades has consistently been under 60%.

Emerging evidence suggests that the oral microbiota plays a crucial role in the development and progression of OSCC through chronic inflammation and direct carcinogenic effects. Among these microorganisms, *Prevotella intermedia* is an opportunistic oral pathogen commonly associated with periodontal disease. However, its contribution to OSCC pathogenesis remains poorly understood.

Therefore, the main goals of our study were to understand whether *P. intermedia* affects OSCC cell proliferation and migration, and to identify possible target genes for further mechanism studies.

Methods: OSCC cell lines were infected with *P. intermedia* under controlled *in vitro* conditions.

- **Cell proliferation**
  Quantified by cell counting and BrdU assay to assess proliferation rate.
- **Cell invasion and metastasis**
  Wound healing assay was utilized to study cancer invasion and metastasis.
- **qPCR analysis**
  mRNA expression levels were measured for the following categories: Cell proliferation markers, inflammation markers, apoptosis markers, and interferon response marker.

Results:

1. Cell Proliferation Assay
We performed co-culture of SCC-25 cells with *P. intermedia* at different MOIs. The cell numbers in MOI1 and MOI10 groups were higher than in the uninfected control group.

2. Wound Healing Assay
We created a cross-shaped scratch and monitored cell movement to evaluate invasion and migration ability. The results showed that after 24 hours, all groups healed slowly and at similar rates.

3. Gene Expression Analysis
We collected cells at several time points after infection and then performed qPCR to analyze selected genes known to be related to proliferation, inflammation, and apoptosis. Three genes (IL-8, ISG15, and AREG) were upregulated more than 5-fold. Interestingly, EMT markers related to invasion (CDH1 and CDH2) showed no significant difference or were even downregulated.

Conclusions: Our findings identify that *P. intermedia* promotes OSCC cell proliferation through activation of multiple oncogenic and inflammatory signaling pathways, including PI3K/Akt and MARK/ERK signaling pathways. These results suggest that *P. intermedia* may act as a tumor-promoting pathogen in the oral microenvironment.

Title: Automated Assessment of YouTube Patient Education Videos Using API-Based Data Extraction and Cognitive Load Analysis

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Abstract

Background: YouTube is increasingly used by patients seeking health information, yet the linguistic complexity and cognitive demands of medical content remain poorly characterized. Standardized methods for evaluating patient-facing YouTube videos at scale are lacking.

Objective: To develop and pilot an automated pipeline for extracting and analyzing YouTube patient education videos using application programming interfaces (APIs) and computational linguistic assessment.

Methods: A cross-sectional analysis of YouTube videos was conducted using the search query "shoulder arthroscopy." Videos published within six months of the search date were retrieved using the YouTube Data API v3. A new YouTube account was created to avoid algorithmic personalization. Video metadata (duration, views, likes, comments) and channel characteristics (subscriber count, video count) were extracted programmatically. Transcripts were retrieved using yt-dlp with randomized batching protocols to mimic human browsing behavior. Cognitive load was assessed using words per minute (WPM), Flesch-Kincaid Grade Level, lexical diversity (type-token ratio), and medical jargon density. A composite cognitive load score (0-100) was calculated from normalized component metrics. Descriptive statistics and Spearman correlations were used to characterize the sample and explore associations between video characteristics and engagement.

Results: 317 videos were identified, with transcripts successfully retrieved for 242 (76.3%). The majority of videos (90.5%) were under 5 minutes in duration. Median views were 1,352 (IQR: 313-5,966). Median cognitive load score was 87.7 (IQR: 80.6-95.2). No significant correlations were observed between cognitive load and engagement metrics ($p > 0.05$ for all comparisons).

Conclusion: This pilot demonstrates a scalable, reproducible method for automated assessment of YouTube patient education content. The predominance of short-form videos with high cognitive load suggests patients may encounter dense, rapidly delivered medical information. This pipeline can be applied across medical specialties to characterize the patient-accessible educational landscape on YouTube

Title: **Evaluation of Online Patient Education Resources Recommended by ChatGPT and Google Gemini for Shoulder and Knee Surgery FAQs**

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Abstract

Introduction/Objectives: Large language models are increasingly used by patients to seek health information and frequently provide links to external websites for further reading. While prior studies have evaluated the accuracy of AI-generated responses, the quality and accessibility of the online resources recommended by these systems remain poorly characterized. The objective of this study is to evaluate the quality, transparency, understandability, actionability, and readability of online health information resources recommended by ChatGPT and Google Gemini for frequently asked questions about shoulder and knee surgery.

Methods: This cross-sectional content analysis evaluated 40 FAQ URL pairs generated by ChatGPT and Google Gemini in response to standardized prompts regarding shoulder and knee surgery. Websites were assessed using the JAMA Benchmark Criteria for transparency, the Brief DISCERN instrument for information quality, the Patient Education Materials Assessment Tool for understandability and actionability, and Flesch Kincaid Grade Level and Flesch Reading Ease metrics for readability. Questions and website sources were categorized using Rothwell's classification system. Descriptive statistics and non-parametric comparisons were performed.

Results: Most FAQs generated by both models were classified as fact-based questions, primarily related to recovery timelines, technical details, and activity restrictions. Medical practice websites were the most commonly recommended source. Transparency scores were low overall, with only 10 percent of ChatGPT-recommended websites and 5 percent of Gemini-recommended websites meeting criteria for good transparency. Academic websites demonstrated significantly higher transparency scores than medical practice websites. Information quality scores were moderate, with consistent deficiencies in source attribution and currency. Understandability and actionability scores were high across both models, exceeding 85 percent. In contrast, readability was poor, with mean Flesch Kincaid Grade Levels exceeding a college reading level and Flesch Reading Ease scores well below recommended thresholds for patient education.

Conclusions: Online health information resources recommended by large language models for sports medicine surgery questions are generally understandable and actionable but lack transparency and are written at reading levels that exceed patient education recommendations. Clinicians should be aware of these limitations when counseling patients who use AI tools and may consider directing patients to higher quality, more accessible resources.

Keywords: Large Language Models; ChatGPT; Google Gemini; AI-generated health information; Sports medicine; orthopedic surgery; DISCERN; JAMA Benchmark Criteria; Patient information-seeking behavior

Title: **Assessing the Clinical Usefulness and Transparency of Knee Arthroplasty RCTs (2020–2024): A Systematic Review Using the van ’t Hooft Framework**

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Abstract

Background: Osteoarthritis is the most common joint disorder in the United States, and total knee arthroplasty (TKA) is among the most frequently performed surgeries. Although randomized controlled trials (RCTs) are essential for guiding treatment, their clinical usefulness remains uncertain. This study assessed the utility of TKA RCTs published between 2020 and 2024 using the van't Hooft usefulness framework.

Methods: We systematically reviewed RCTs of knee arthroplasty published between 2020 and 2024, identified through MEDLINE and Embase (April 2, 2025). Utility was assessed using the 13-item van't Hooft framework. Linear regression analyzed associations between utility scores and study characteristics, including funding, sample size, and journal impact factor.

Results: Of 184 studies, 29.3% met the problem-base criterion. Although 86.4% included patient-centered outcomes, most were secondary. Pragmatism was rare (1.1%). 23.9% were prospectively registered, and 4.9% provided raw data. Transparency and clinical utility were moderately correlated ($r = 0.28$, $p < 0.001$).

Conclusion: Most RCTs showed internal validity but limited real-world relevance. Narrow eligibility, short follow-up, and poor transparency limit clinical impact. These findings should not be interpreted as a dismissal. Rather, they highlight opportunities to strengthen future trials so that they remain a cornerstone of evidence-based orthopaedics.

Title: **Naloxone-Precipitated Oxycodone Withdrawal Disrupts the Gut Microbiome in BDNF Val66Met Mice**

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Abstract

Introduction/Objectives: Opioid withdrawal is characterized by severe physiological and behavioral disruptions, including hyperlocomotion, tremors, and autonomic dysregulation. While chronic opioid use is known to perturb gut microbiota, the acute impact of withdrawal on microbial community structure remains poorly characterized. Rapid, host-mediated changes in gut physiology during withdrawal, such as altered motility, mucus secretion, and immune activation, could profoundly affect microbial composition profiling within minutes. This study tested the hypothesis that naloxone-precipitated withdrawal induces rapid, measurable changes in the detected gut microbial community structure and that these changes correlate with the severity of behavioral withdrawal signs.

Methods: C57BL/6 mice were treated with an escalating oxycodone regimen (9.0–33 mg/kg) or saline twice daily for eight days, as described above. On the final day (PND 75–76), subsets received a final dose of oxycodone or saline. Half of each group was then administered naloxone (1 mg/kg, i.p.) 90 minutes post-injection to precipitate withdrawal. Behavioral sessions lasted 20 minutes and were recorded with EthoVision XT software. Behaviors including locomotion, jumping, wet dog shakes, grooming, rearing, sniffing, and seizures were scored in five-minute intervals and summed to obtain total behavioral counts.

Fecal samples were collected immediately after behavioral assessment under sterile conditions and stored at −80 °C. DNA was extracted using the ZymoBIOMICS™ DNA Microprep Kit and processed for 16S rRNA gene amplicon sequencing (V3-V4 region) on the Illumina NextSeq 2000 platform. Sequences were processed with QIIME2 (v2025.7), denoised, and assigned to ATVs at 97% similarity. Beta diversity was assessed using unweighted UniFrac and Bray–Curtis distances, and pairwise PERMANOVA was used to determine statistical significance.

Results: Acute naloxone-precipitated withdrawal produced rapid and pronounced shifts in the detected gut microbial community composition. The oxycodone–naloxone (OXY_NAL) group exhibited the most divergent profile relative to all other groups, with unweighted UniFrac pseudo-F = 17.71 ($p = 0.001$) and Bray–Curtis pseudo-F = 29.99 ($p = 0.001$). Oxycodone alone (OXY vs SAL) also produced significant but smaller changes (pseudo-F = 5.30), whereas naloxone administered to saline-treated mice (SAL_NAL) altered community composition (pseudo-F = 8.39), demonstrating that naloxone has independent, host-mediated effects on microbial structure. Behavioral analysis confirmed a marked increase in overall withdrawal signs in OXY_NAL mice, including jumping, wet dog shakes, and hyperlocomotion, aligning with the largest observed microbial shifts.

Conclusions: Future work will investigate causal relationships between microbial shifts and withdrawal behaviors, evaluate specific taxa associated with withdrawal severity, and explore microbiome-targeted interventions to alleviate opioid withdrawal symptoms.

Title: Predicating Non-Contact Injuries in Male Professional Soccer Athletes Using GPS Tracking and Machine Learning: A Critically Appraised Topic

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Abstract

Clinical Scenario: Training load fluctuations can place professional soccer athletes at a heightened risk for non-contact injuries. Traditional monitoring methods, such as rates of perceived exertion or minute counts, lack precision to identify workload patterns associated with injury risk. Advances in technology offer a new alternative to objectively predict injury risk through combining data from GPS-based wearable technology and machine learning.
Clinical Question: Is GPS tracking and machine learning an effective tool for injury prediction in male professional soccer athletes?

Summary of Findings: Across the three studies reviewed, GPS data and machine learning proved to be 65.08-78% accurate at identifying risk of injury. The sensitivity and specificity outcome measurements of the included studies provide further support for the effectiveness of integrating GPS technology and machine learning to predict injury risk.

Clinical Bottom Line: Moderate evidence indicates that GPS-based training load data analyzed through machine learning algorithms can effectively identify patterns associated with non-contact injury risks in male professional soccer athletes.

Strength of Recommendation: Multiple CEBM level 2b studies consistently support the use of GPS-derived data and machine learning as an effective tool for predicting injury risk in professional male soccer athletes.

Title: Dual-target chimeric protein vaccine against *C. difficile*

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Abstract

Introduction: *Clostridioides difficile* is a Gram-positive, rod-shaped, spore-forming anaerobic bacterium found in the environment. *C. difficile* can colonize the colon and act as an opportunistic pathogen, becoming infectious after antibiotic treatment. Symptoms of *C. difficile* infection (CDI) include diarrhea, which can progress to pseudomembranous colitis and, if left untreated, death. Treatment options include the more broad-spectrum antibiotics metronidazole, vancomycin, and the narrow-spectrum fidaxomicin. However, using antibiotics to treat the infection also kills many other bacteria in the gut, which can allow for the recolonization of *C. difficile* and create a cycle of reinfection. It is frequently transmitted in hospitals and nursing homes, but can also spread in community settings where access to adequate hygiene products and sanitation systems is limited.

Methods: Our laboratory is working to develop a vaccine against CDI. The vaccine antigens are purified recombinant chimeric proteins expressed by non-toxigenic *E. coli*. The first half of the chimeric protein consists of the receptor-binding domain of *C. difficile* TcdB toxin, which stimulates toxin-neutralizing antibodies. The second half consists of a protein exposed on the bacterial surface, which stimulates antibodies that can bind to and coat *C. difficile*. We are currently cloning, overexpressing, and purifying these chimeric proteins

Results: We successfully purified TcdB, TcdB-Cwp66, TcdB-CrtP, via nickel column chromatography and verified the presence of these chimeric proteins by Western blot; however, TcdB-SlpA protein purification was unsuccessful. Purified proteins will then be tested for their immunogenicity and protective efficacy in a mouse model

Conclusion: Chimeric proteins will be purified by FPLC and used to immunize mice to evaluate vaccine immunogenicity. Immune responses will be assessed using ELISA, followed by *Clostridioides difficile* challenge in vaccinated and unvaccinated mice to determine the immunogenicity of the chimeric vaccine. Gut microbiome analysis after vaccination and infection will further characterize host responses. This future research will help determine the potential of a chimeric protein–based vaccine for protection against *C. difficile* infection.

Keywords: *C. difficile*, Vaccine, Immunology, Mice

Title: Characterizing Measles Vaccine Discourse on TikTok: A Cross-Sectional Analysis of Engagement, Sentiment, and Misinformation

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Abstract

Introduction: Measles outbreaks have increased globally as vaccine hesitancy rises, driven largely by misinformation circulating on social media. TikTok, one of the fastest-growing platforms for health information, contains a mixture of accurate content and misleading narratives. This study evaluated the characteristics, themes, and vaccine-related discourse present in measles content on TikTok.

Methods: We performed a cross-sectional content and thematic analysis of TikTok posts under four measles-related hashtags. The top posts from each hashtag were screened, with duplicates removed. For each post, account type, engagement metrics, and vaccine stance were extracted. The top comments were coded for sentiment, thematic content, misinformation, and user affiliation. Quantitative data were summarized descriptively, and qualitative data were coded using a hybrid inductive–deductive framework.

Results: Fifty-two posts and 255 comments were analyzed. Negative sentiment accounted for 41.1% of comments, followed by positive (36.5%) and neutral (22.4%). Support for vaccination was the most common theme (51.3%), with emotional appeals (22.1%) and personal anecdotes (18.3%) also prevalent. Misinformation was present in 6.8% of comments, though conspiratorial content was rare (0.4%). Most comments were authored by laypersons (81.7%), whereas healthcare professionals contributed only 1.1%, despite generating nearly half of the original posts.

Conclusions: Measles-related TikTok discourse is dominated by lay users, emotional narratives, and limited professional engagement. Although misinformation volume was relatively low, its presence alongside strong emotional themes underscores the need for greater healthcare professional participation in digital vaccine communication.

Keywords: Measles; TikTok; Vaccine hesitancy; Social media; Misinformation; Public health communication

Title: Selective Harm Reporting in Inflammatory Sinonasal Trials: A Systematic Review of Registry–Publication Concordance

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Abstract

Objective: To assess the completeness, consistency, and transparency of adverse event (AE) reporting in clinical trials of inflammatory sinonasal diseases by comparing data from ClinicalTrials.gov and corresponding peer-reviewed publications.

Data Sources: ClinicalTrials.gov registry and MEDLINE-indexed journal articles reporting results of interventional trials focused on inflammatory sinonasal disease.

Review Methods: We identified trials with posted results between 2014 and 2024 and matched registry records with corresponding publications. Data extraction included structured and narrative AE fields. Outcomes assessed were serious adverse events (SAEs), other adverse events (OAEs), mortality, and AE-related discontinuations. Reporting concordance was analyzed using descriptive statistics, Bland-Altman plots, funnel plots, and linear regression to evaluate temporal trends and reporting predictors. Only direct numerical matches were accepted; we made no inferences from narrative text.

Results: Among 108 included trials, 57 (52.8%) met criteria for likely Applicable Clinical Trials (ACTs). AE reporting was more complete on ClinicalTrials.gov than in publications. For example, 94.7% of ACTs reported SAEs in the registry compared to 80.7% in corresponding publications, and death reporting increased from 38% to 100% in registry data following the 2017 Final Rule. However, publication reporting did not show corresponding improvement. Funnel plots revealed dispersion in AE rates among smaller trials, while linear regression showed modest gains in registry reporting over time.

Conclusion: Despite regulatory improvements, publication-based AE reporting remains incomplete and inconsistent. Clinical trial registries remain an essential, yet underutilized, resource for harm-related evidence in sinonasal disease research.

Title: Role of Mitochondrial Dynamics in Early Life Stress

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Abstract

Introduction/Objectives: Early life stress (ELS) is a traumatic experience during childhood, which can lead to long-term mental and physical health problems later in life. These adverse experiences can alter the developing brain causing depression, anxiety, and a wide range of physical health issues throughout a person's life. In case of rodents, Limited bedding and nesting (LBN) is an ELS model where pup rearing dams receive low bedding and nesting material. This trigger fragmented care of the dams towards the pups, which is characterized by physical abuse and neglect. Adolescence is a critical developmental window characterized by significant cognitive and emotional development as individuals transition. The mPFC undergoes one of the most prolonged and significant periods of maturation during adolescence. ELS significantly alters the mPFC, disrupting its development and connectivity, leading to impaired emotional regulation, heightened anxiety, attention issues, and increased risk for mental health disorders like depression. Mitochondria are highly dynamic organelles that readily sense and respond to internal and environmental changes. The role of mitochondria in diseases such as Alzheimer and Parkinson is well known. However, the role of mitochondria in ELS is not well understood.

Methods: Mitochondrial DNA (mtDNA) was isolated from mPFC tissue punches of adolescent rats exposed to standard, LBN rearing conditions with or without exposure to favorable environmental factors. mtDNA was then subjected to COMET Assay for detecting overall damage. The Relative copy number (RCN) of mtDNA was estimated by Taqman probe-based qPCR assay to detect the changes in mitochondrial level.

Results: mtDNA damage was significantly increased in the mPFC of LBN animals compared to naïve controls. In addition, exposure to LBN conditions significantly increased the RCN of mtDNA. To mitigate mtDNA damage, favorable environmental interventions, including environmental enrichment and cross-fostering, were implemented. Both environmental enrichment and cross-fostering significantly reduced mtDNA damage in LBN exposed mPFC tissues. Furthermore, these interventions showed a trend toward reducing mtDNA RCN in LBN-exposed samples.

Conclusions: In conclusion, LBN causes mtDNA damage in the mPFC, and this damage can be mitigated by favorable environmental factors.

Keywords: Early life stress, Limited bedding and nesting, Mitochondria

Title: Breastfeeding Patterns and Social Determinants Among Children With Hearing Loss: Evidence From the National Survey of Children's Health

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Abstract

Introduction/Objectives: Breastfeeding provides significant health benefits for the infant, including reduced risk of infections, and supports early communication development through infant-caregiver interaction. Children who are deaf or hard of hearing face unique communication barriers that affect bonding and feeding practices, yet breastfeeding patterns remain understudied in this population. Therefore, our primary objective was to examine rates of breastfeeding initiation and duration among children with and without reported hearing loss or deafness using data from the National Survey of Children's Health.

Methods: We conducted a cross-sectional analysis of the National Survey of Children's Health to assess differences in breastfeeding rates—ever and continuation to 6 months which is the standard set by the American Academy of Pediatrics. Logistic regression models were used to determine associations, via odd-ratios (OR) between children with and without hearing loss.

Results: Our sample included a total of 40,829 children, of whom 1.1% were reported to have hearing loss or be deaf. Breastfeeding rates were significantly lower among the children with hearing loss compared to the referent group (69.7% vs 82.3%, respectively; OR: 0.50; 95%CI: 0.30-0.81, P = .005). Similarly, the odds of reaching 6 months of breastfeeding were lower among children who were deaf (OR: 0.58; 95%CI: 0.36-0.92, P = .021).

Conclusions: Children who are deaf or hard of hearing experience significantly lower rates of breastfeeding and shorter breastfeeding duration compared to children with normal hearing. This disparity suggests the presence of modifiable barriers to families of deaf or hard-of-hearing infants, highlighting a need for targeted, culturally appropriate lactation support. Addressing these barriers may improve breastfeeding rates and ensure that the proven health benefits of breastfeeding are available to all infants.

Keywords: breastfeeding; hearing loss; health disparities

Title: Cold water immersion therapy and effects on insulin: a scoping review

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Abstract

Background: Cold water immersion (CWI) is a growing trend among health and wellness communities due to its effects on brown adipose tissue activation, and neurotransmitter modulation. However, its impact on insulin sensitivity and glucose metabolism in humans remains underexplored. This scoping review aims to evaluate the existing literature on the effects of CWI on insulin-related metabolic markers in humans and to identify the knowledge gaps that currently exist in this field of study.

Methods: A scoping review was conducted by two authors (JG and BM) according to the Joanna Briggs Institute (JBI) guidelines and framework. A systematic search of PubMed, Embase, and Cochrane databases was conducted on July 11th 2025 using search strings developed by a trained librarian. Title and abstract screening, as well as full-text review and data extraction, were performed in a masked, duplicative fashion. Inclusion criteria required human studies published in English from 2000 onward that utilized CWI and measured insulin, glucose, or related metabolic outcomes.

Results: A total of 941 articles were identified with 67 articles selected for further review. Ultimately, six studies met our inclusion criteria. These studies varied in participant demographics (male, female, mixed cohorts) and age groups ranged from 18 to 55+. Intervention duration included mostly acute sessions. The majority of studies reported an improvement in insulin sensitivity and glucose utilization by peripheral tissues, as well as brown adipose tissue (BAT) utilization. However two studies reported negative metabolic effects. Only two studies used full-body CWI, while the remainder used cold suits or partial immersion techniques.

Conclusion: Current research suggests that non-shivering-inducing CWI can enhance insulin sensitivity and glucose metabolism in humans. This finding supports the potential for CWI to be used as an adjunct therapy for insulin resistance or type 2 diabetes. However, methodologic variability and a lack of high-quality, long-duration studies highlight the need for further research, particularly on full-body immersion protocols, to clarify their efficacy and clinical applicability.

Title: Assessing the Clinical Usefulness of Randomized Trials for Transarterial Chemoembolization and Transarterial Radioembolization: A Systematic Review

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Abstract

Background: Transarterial chemoembolization (TACE) and transarterial radioembolization (TARE) are common interventional treatments for hepatocellular carcinoma (HCC), particularly for patients who are ineligible for curative options. Although randomized controlled trials (RCTs) have been instrumental in validating these therapies, their real-world applicability, transparency, and clinical utility remain uncertain.This study evaluated the usefulness and clinical relevance of RCTs on TACE and TARE in HCC and liver metastases using the van ’t Hooft et al. framework. This 13-criterion tool spans eight domains, including trial quality, feasibility, and transparency.

Methods: A systematic review of RCTs published from 2004 to 2024 was conducted via MEDLINE and Embase. Eligible studies were screened and assessed independently by two reviewers based on the van ’t Hooft et al. criteria, which include context placement, information gain, feasibility, patient-centeredness, pragmatism, value for money, and transparency. Descriptive statistics and regression analyses explored trends. Risk of bias was not assessed due to the unavailability of RobotReviewer.

Results: Among 135 included RCTs, most performed well in areas like context placement and conflict-of-interest disclosure. However, major gaps were found in raw data availability (9.6%), self-evaluated cost-value analysis (0%), and self-evaluation for pragmatism (0.7%). Many trials lacked feasibility considerations and preregistration, limiting their transparency and clinical relevance.

Conclusion: RCTs in interventional oncology often lack key features necessary for clinical impact. Improving trial pragmatism, transparency, and financial accountability is essential. Structured tools like the van ’t Hooft framework may enhance the design and relevance of future studies.

Keywords: Transarterial Chemoembolization; Transarterial Radioembolization; Hepatocellular Carcinoma; Randomized Controlled Trial; Patient-Centered Outcome; Pragmatic Clinical Trials; Systematic Review; Research Transparency; Evidence-Based Medicine

Title: **Characteristics, Imaging Modality, and Outcomes of Skeletal Injuries in the Emergency Department Using NHAMCS**

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Affiliations

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Abstract

Background: Skeletal injuries are common in trauma patients and often require urgent, specialized care due to their risk of severe complications. This paper explores how injury location influences triage decisions in the emergency department (ED) and which imaging modalities are commonly used. The secondary goal of this study is to examine the characteristics and outcomes of such injuries using triage level based on ICD-10 codes.

Methods: We used the 2021 National Hospital Ambulatory Medical Care Survey to assess the characteristics of skeletal injuries in the ED. Individuals assigned a triage level and those with an "S" ICD-10 code in one of the cause codes in the survey were included in this study. First, we looked at the location of injury and imaging modalities used in the ED by triage level. We examined multiple demographic and geographic characteristics by triage level. We also examined the outcomes of these injuries by looking at admission rates, how they arrived at the hospital, whether they were transferred, and if they came back within 72 hours.

Results: Injury location, imaging utilization, and imaging modality were all significantly associated with triage acuity (all $p < .0001$). Higher-acuity presentations more frequently involved head, neck, thoracic, and hip injuries and were significantly more likely to undergo imaging, particularly advanced modalities such as CT. In contrast, lower-acuity cases were dominated by extremity injuries and were more often managed without imaging or with plain radiography alone. Patient demographics, insurance status, disposition, and care processes differed significantly by triage acuity. Higher-acuity presentations were more common among adults and older patients, those admitted, arriving by ambulance, or requiring hospital transfer, and were associated with longer wait times and lengths of stay (all $p < .05$). Lower-acuity visits were more frequent among younger patients, were less likely to involve ambulance arrival or admission, and had shorter wait times and hospital stays.

Conclusion: Triage acuity was strongly associated with injury characteristics, imaging use, and healthcare utilization among patients with skeletal injuries. Higher-acuity presentations involved higher-risk injury locations and greater use of advanced imaging, ambulance arrival, and hospital admission, whereas lower-acuity visits were dominated by extremity injuries and required fewer diagnostic and hospital resources.

Keywords: skeletal injuries, emergency department, triage, location of injury, rural

Title: **Effectiveness of BMI in Assessing Risk of Cardiovascular Disease in Rheumatoid Arthritis**

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Abstract

Background: Rheumatoid Arthritis (RA) is an autoimmune disease that attacks the synovium, and causes joint inflammation and many extra-articular manifestations. RA can cause severe morbidity and mortality, with the most common cause of premature death being associated with cardiovascular disease (CVD). Body mass index (BMI) is an easily obtained and frequently used measure to gauge risk of common health problems, including CVD. Obesity is a known risk factor for CVD and is seen at increased rates in those with RA. This study aimed to measure rates of coronary artery disease (CAD), hypertension, hypercholesterolemia, and diabetes in RA within each BMI category and within groups based on total body fat percentage, obtained via Dual-Energy X-ray Absorptiometry (DEXA) scan.

Methods: We conducted a cross-sectional analysis using data collected from the National Health and Nutrition Survey (NHANES) from 2015-2023. Adults ages 18 and older were included who had the following: RA diagnosis, height and weight measurements, DEXA scan. Sensitivity and specificity were calculated for body composition measures (BMI category and body fat (BF) indices measured via DEXA for coronary artery disease, hypertension, hypercholesterolemia, and diabetes.

Results: While DEXA measures showed high sensitivity (0.90-0.97) across comorbidities, they had very low specificity; conversely, obesity (BMI>30) had lower sensitivity, but higher specificity (0.64-0.68). Overall, DEXA measures performed best as screening tools, while higher BMI thresholds better identified individuals without disease.

Conclusions: As body composition has long been shown to be a risk indicator of comorbidities, our analysis showed that solely relying on these is not an adequate clinical measure—especially among individuals with RA. However, used in combination with other risk factors, BMI and BF percentages have been shown to be moderate indicators of overall health.

Keywords: Rheumatoid Arthritis, Cardiovascular Disease, Body Mass Index

Title: Advancing the Evidence Base for Phantom Limb Pain Management: A Systematic Appraisal of Two Decades of Randomized Controlled Trials

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Abstract

Background: Phantom limb pain (PLP) affects up to 80% of individuals following amputation and often persisting for decades and contributing to substantial personal and economic burden. Although PLP is increasingly understood as a biopsychosocial condition, randomized controlled trials (RCTs) often prioritize short-term pain outcomes, overlooking functional, psychological, and economic domains essential to long-term recovery. This study aimed to systematically evaluate the clinical utility and transparency of RCTs for post-amputation pain, with an emphasis on PLP, using a framework that prioritizes patient-centered outcomes and real-world applicability.

Methods: A systematic review of Embase (including MEDLINE) was conducted on June 12, 2025, targeting English-language RCTs from 2004–2024 that assessed interventions for PLP. Trials focusing on safety, cost analyses, or pediatric populations were excluded. Two independent reviewers screened studies, extracted data, and assessed trial characteristics using a 13-item "usefulness" scale adapted from van 't Hooft et al., which evaluates problem relevance, pragmatism, transparency, and reporting quality. A total of 44 trials met inclusion criteria. Descriptive statistics and regression analyses explored trends over time.

Results: Of the 44 included trials, most trials were published in pain-focused journals (32%) and enrolled small samples (median = 36). Only 6.8% addressed a defined clinical priority, and none incorporated pragmatic trial designs or health-economic outcomes. Transparency varied: 32% had pre-registered protocols, 48% reported protocol adherence, and just 4.5% provided raw data access. A total of 71 violations of pragmatic design were noted, with assessor blinding being the most frequent. Transparency and clinical utility were moderately correlated ($r = 0.38$, $*p* = 0.011$), and journal impact factor was the only predictor of higher usefulness scores. Over time, transparency improved significantly, though gains in clinical relevance lagged behind.

Conclusion: RCTs targeting PLP have become more transparent over the past two decades but still frequently fall short in addressing outcomes that matter most to patients, such as prosthesis use, mobility, and mood. The disconnect between research design and clinical applicability highlights an ongoing evidence-to-practice gap. Embedding pragmatic principles, open data standards, and functional outcome measures in future trials will be key to advancing effective, patient-centered care for individuals living with limb loss.

Title: **Assessing the Changes in Outcome Measurements in Randomized Controlled Trials of Regional Anesthesia Interventions: A Registry-Publication Comparison Study**

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Abstract:

Background: Regional anesthesia (RA) is increasingly utilized due to its safety and effectiveness in reducing postoperative pain and opioid use. However, inconsistent outcome reporting practices in RA clinical trials threaten the reliability of evidence used to guide clinical decision-making. This study assessed the extent and nature of temporal changes to prespecified outcomes in interventional RA trials registered on ClinicalTrials.gov after the implementation of the Final Rule and FDAAA 801.

Methods: We conducted a registry-based cross-sectional analysis of RA trials initiated between January 2017 and December 2024. Eligible trials enrolled adults, were interventional in design, had posted tabular results on ClinicalTrials.gov, and were linked to a peer-reviewed publication. Using ClinicalTrials.gov version histories, we compared the earliest and most recent registry records to identify modifications in outcome definitions, timing, and classifications. Changes were categorized by type, timing, and interpretive impact. Disclosure of modifications in registry records and publications was assessed.

Results: Among 74 eligible trials, 100% exhibited at least one outcome change between registration and publication. Most modifications occurred after the primary completion date (45.9%) or after publication (51.4%), and none were disclosed. Changes to both primary and secondary outcomes were common, with 36.5% of trials exhibiting high-impact modifications. Minor rewording was the most frequent change type, though often accompanied by more substantive shifts in outcome measurement tools, timepoints, or classifications. Secondary outcomes were more frequently added or removed than primary outcomes.

Discussion: Outcome modifications in RA trials are pervasive and frequently undisclosed, even under current regulatory frameworks. These findings highlight critical gaps in transparency and suggest a need for stronger enforcement of reporting requirements, increased editorial oversight, and education on best practices in outcome registration. Transparent reporting is essential to ensure the integrity and applicability of RA clinical research.

Key Words: regional anesthesia, outcome measures, changes in outcomes, research transparency

Title: Comparative Antibody Responses Following Intraperitoneal and Subcutaneous Vaccination in *Clostridioides difficile* Vaccine Development

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Abstract

Introduction/Objectives: *Clostridioides difficile* is a gram-positive, spore-forming, toxin-producing anaerobe and one of the leading causes of antibiotic-associated diarrhea. *C. difficile* infections (CDI) can range from mild diarrhea to pseudomembranous colitis, and if left untreated, can lead to death. The standard treatment options for acute CDI are limited to a selection of three antibiotics: Metronidazole, Vancomycin, or Fidaxomicin. All these antibiotics have limited effectiveness due to the continual disruption of the normal gut flora, leading to high rates of recurrent infections. To combat this problem, research is exploring vaccine-based prevention, with prior findings showing that immunization with a portion of the *C. difficile* toxin TcdB can provide protective immunity in mice. This study aims to add to this body of work by examining vaccination routes in a mouse model to determine whether there is a notable difference between intraperitoneal (IP) and subcutaneous injection (SC).

Methods: Twelve mice were divided into four groups, each assigned a vaccination route (IP or SC). Two groups were assigned as controls, receiving only PBS+Alum, and the other two were experimental and received 50 µg of rTcdB+Alum via their assigned vaccination route. Mice were vaccinated every 7 days for a total of 3 vaccinations. Blood samples were collected one day before each vaccination, and a terminal blood sample was taken at euthanasia 2 weeks after the last vaccination. Blood serum was collected from these samples, and endpoint ELISAs were performed to determine antigen-specific IgG responses. Lastly, fecal IgA responses were examined using cecum fecal samples collected at euthanasia.

Results: Antigen-specific IgG responses were highly significant even after the first vaccination for both IP and SC. When comparing IP versus SC routes, both performed similarly, with IP having a slightly more robust response after each vaccination. A significant difference between the two routes was observed after the third vaccination. However, two weeks post last vaccination, antibody levels between the two groups were similar. Fecal antigen-specific IgAs indicated that both IP and SC routes of injection produced significant levels of IgAs in fecal material. Comparing the two injection routes, IP yielded a stronger IgA response; however, it was not significantly different from that of SC injection. The antibody response indicates that both routes elicited a strong, significant response.

Conclusions: *C. difficile* is a leading cause of antibiotic-associated diarrhea. With treatment options resulting in high rates of relapse. This study sought to add to the body of work examining vaccination by examining IP vs. SC injection routes. Both IP and SC immunization generated robust antigen-specific IgG and fecal IgA responses, with only minor differences between routes. These findings suggest that the vaccination route does not substantially impact immunogenicity, supporting the flexibility of administration strategies in the continued development of a *C. difficile* vaccine.

Keywords: *Clostridioides difficile*, Vaccine, Antibody Response

Title: AI-Generated Lab Interpretation FAQs: Readability, Transparency, and Usability of ChatGPT vs Gemini

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Abstract

Introduction: Patients increasingly use large language models (LLMs) such as ChatGPT and Google Gemini to interpret laboratory results. With the growing integration of AI into health information platforms, verifying the quality, readability, and usability of frequently asked questions (FAQs) is essential. The purpose of this study was to compare the type, readability, transparency, and usability of lab interpretation FAQs generated by ChatGPT and Gemini.

Methods: The top 40 FAQs (20 per platform) with corresponding answers and cited sources were obtained from ChatGPT and Gemini. FAQs were classified using Rothwell's system. Transparency of cited resources was scored using the Journal of the American Medical Association (JAMA) benchmark criteria, and quality was assessed using the Brief DISCERN instrument for intervention-related FAQs. Readability of AI-generated answers was measured using Flesch Reading Ease (FRE) and Flesch-Kincaid Grade Level (FKGL). Usability was evaluated using an adapted Patient Education Materials Assessment Tool (PEMAT-P) for understandability and actionability. Nonparametric tests compared platforms, with Benjamini–Hochberg adjustment for multiple comparisons.

Results: All FAQs were classified as fact-based (100%). Gemini responses were significantly more readable (mean FKGL 13.3 vs 17.1; FRE 33.5 vs 0.5; FDR-adjusted $p<0.001$), whereas ChatGPT responses demonstrated greater usability (PEMAT understandability ≈60% vs 33.8%; actionability ≈60% vs 15%; both FDR-adjusted $p<0.001$). Transparency was low across both models (mean JAMA score: ChatGPT 1.8, Gemini 1.2), and no responses met JAMA criteria for high-quality information (score >3). DISCERN scoring was applicable to a limited subset of intervention-related responses and revealed low overall treatment information quality. Website source category (commercial, academic, or government) was not associated with differences in JAMA or DISCERN scores (Kruskal–Wallis $p\geq0.317$). Notably, 50% of cited URLs were inactive, with the highest inactivity among government sources (66.7%), followed by academic (50%) and commercial (44%). This limits patients' ability to verify information and further reduces transparency and trustworthiness.

Conclusion: ChatGPT and Gemini both generated technically accurate responses regarding lab interpretation FAQ's. ChatGPT offered more actionable guidance, whereas Gemini provided slightly easier-to-read content. However, their answers were often highly complex and lacked transparency. Additionally, half of the cited URLs were inactive, preventing patients from confirming sources and highlighting a critical gap in reliability. Taken together, these findings underscore the need to improve the readability and usability of AI-generated health information to better support patient understanding and safety.

Title: Transparency, Quality, and Source Accessibility of AI-Generated Hair Loss Inquiries: A Cross-Sectional Analysis of ChatGPT and Google Gemini

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Abstract

Introduction/Objectives: Hair loss affects millions of individuals in the United States and is associated with substantial psychological distress and reduced quality of life. As patients increasingly seek health information online, generative artificial intelligence (AI) tools such as ChatGPT and Google Gemini have emerged as prominent sources of medical information. However, the quality, transparency, readability, and patient-centeredness of AI-generated information on hair loss remain insufficiently characterized. The objective of this study is to compare the content, transparency, informational quality, readability, and patient-centeredness of frequently asked questions (FAQs) about hair loss generated by ChatGPT and Google Gemini.

Methods: A cross-sectional analysis was conducted using a standardized prompt to generate the top 20 hair loss–related FAQs from each AI model, yielding 40 question–answer–URL pairs. FAQs were classified using Rothwell's framework (fact, policy, value), and cited sources were categorized by website type. Transparency was assessed using the Journal of the American Medical Association (JAMA) Benchmark Criteria, informational quality using the Brief DISCERN instrument, patient-centeredness using the Patient Education Materials Assessment Tool (PEMAT), and readability using Flesch Reading Ease (FRE) and Flesch–Kincaid Grade Level (FKGL). Statistical comparisons were performed using nonparametric tests

Results: Across both models, FAQs were overwhelmingly fact based (ChatGPT 95%; Gemini 90%), with minimal policy-related content and little to no value-based discussion. Most questions focused on technical details of hair loss. Academic sources predominated, though 20% of cited websites were inactive at the time of review. Overall transparency and informational quality were modest, with no significant differences across website source types. ChatGPT demonstrated higher transparency and informational quality for fact-based questions, while Gemini showed relatively stronger performance for policy-oriented content. Both models exhibited high understandability but low actionability on PEMAT assessment. Gemini produced more readable responses overall, with lower grade-level complexity (mean FKGL 9.0 vs. 11.9 for ChatGPT) and higher FRE scores.

Conclusions: AI-generated information on hair loss is largely factual but limited in policy and value-based content, potentially omitting psychosocial considerations relevant to patients. ChatGPT provides more transparent and higher-quality information, whereas Gemini offers greater readability. These findings highlight a trade-off between informational rigor and accessibility in current AI tools and underscore the need for improved standards emphasizing transparency, readability, and actionable guidance. AI should be viewed as an adjunct, not a replacement, for clinician-mediated patient education.

Title: **Evaluating the Trustworthiness of Chat GPT and Google Gemini AI Search Engines in Answering Frequently Asked Patient Questions on Prostate Health**

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Abstract

Introduction: Patients increasingly encounter artificial intelligence (AI)–generated responses to frequently asked questions (FAQs) when seeking information about prostate health. Despite growing use of these tools, the content, sourcing, and patient-centeredness of AI-generated prostate health information have not been well characterized.

Methods: We performed a cross-sectional analysis of AI-generated responses to commonly asked prostate health questions using two commercially available large language models: ChatGPT and Google Gemini. On a single prespecified date, each model was prompted to generate the top 20 most frequently asked prostate-related questions, corresponding answers, and cited website sources. FAQs were categorized by question type and website source. Transparency, informational quality, understandability, and actionability were evaluated using established assessment frameworks. Outcomes were summarized descriptively and compared between AI models.

Results: Forty prostate-related FAQs were analyzed (20 per AI model). Most questions were factual in nature, with fewer addressing management-related topics; no value-based questions were identified. Academic and commercial websites were the most commonly referenced sources, with no significant differences between models. Overall transparency was modest, with inconsistent reporting of authorship, attribution, disclosure, and currency. Informational quality was moderate, with greater emphasis on treatment mechanisms and benefits than on risks or quality-of-life implications. Responses were generally understandable, but actionability was limited, with few providing clear guidance to support patient decision-making. Performance across evaluated domains was similar between AI platforms.

Conclusions: AI-generated prostate health FAQs provide readable and accessible information but demonstrate important limitations in transparency, balance, and actionability. While these tools may help orient patients to prostate-related concepts, they do not consistently support informed decision-making or replace clinician-guided counseling. As AI-generated content becomes more prominent in urologic patient education, efforts to improve accountability and completeness may be necessary to ensure responsible clinical integration.

Keywords: Artificial Intelligence, Prostate, Patient

Title: Assessing the Completeness of Safety Reporting in Clinical Trials of Obstetric Interventions for Labor, Delivery, and Hemorrhage: A Registry-Publication Comparison Study

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Abstract

Introduction/Objectives: Obstetric interventions such as cesarean delivery and postpartum hemorrhage (PPH) management carry maternal and neonatal risks. Despite efforts like the FDA Final Rule to improve trial transparency, adverse event (AE) reporting remains inconsistent. This study evaluated AE reporting concordance between ClinicalTrials.gov and corresponding publications for obstetric trials.

Methods: A registry-publication comparison was conducted using a systematic ClinicalTrials.gov search for obstetric trials with posted results from 2009 to 2024. Eligible trials enrolled pregnant individuals, reported maternal or neonatal safety outcomes, and had a matched publication; those unrelated to obstetrics or lacking AE data were excluded. Dual blinded reviewers performed data extraction. Trials were categorized by regulatory status, and AE reporting consistency and trends were assessed using descriptive statistics, chi-square tests, Bland-Altman plots, funnel plots, and segmented regression. The study was registered with PROSPERO and the Open Science Framework.

Results: Within the 101 included trials, AE reporting was inconsistent. Among post-Final Rule trials, 58% failed to report serious adverse events (SAEs) in registries and 79% omitted them from publications. Other adverse events (OAEs) were unreported in 61% of registries and 87% of publications. Among trials with data in both sources, 63% showed discrepancies in SAE counts. Funnel plots revealed high variability in SAE rates, particularly in smaller trials. Segmented regression showed no significant change post–Final Rule, though linear regression indicated a modest increase in reporting scores (unadjusted $p < 0{\cdot}0001$; adjusted $p = 0{\cdot}004$).

Conclusions: Despite regulatory mandates, AE reporting in obstetric trials remains incomplete and inconsistent between registries and publications. These discrepancies hinder risk-benefit assessments, compromise clinical guideline development, and may obscure true safety profiles. Enhanced enforcement of reporting standards and routine integration of registry data into obstetric evidence syntheses will be essential to improving maternal and neonatal safety.

Keywords: Obstetrics, Interventions, Reporting

Title: **Healthcare among Hispanic/Latino children: Unmet needs and family-centered care**

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Abstract

Introduction/Objectives: Family-centered care is a collaborative decision-making process between the healthcare provider, the patient, and their family. While unmet needs are universally detrimental, certain groups in the United States, like Hispanic and Latino communities, may experience greater disparities in both unmet need and access to family-centered care—especially those who are from recent immigrant families. This study aimed to examine the role that generational nativity plays in medical home status among Hispanic and Latino children, and to determine the extent to which language may exacerbate unmet medical needs

Methods: We used data from the 2021-2022 National Survey of Children's Health (NSCH) to assess the impact of nativity and language on medical home status. To measure associations, we used design-based chi-square tests and regression models, adjusting for demographic and socioeconomic factors.

Results: The sample included 16,202 Hispanic/Latino children, of which 5.3% were first generation, 46.3% second generation, and 42% third generation or higher. Overall, 26.2% met medical home criteria—which varied significantly by generational status with first-generation children having the lowest prevalence (11.8%), second-generation at 22.0%, and third-generation children at 33.2% (P<.0001). Similar disparities were observed among ratings of family-centered care and other medical home components. Further, children in households where Spanish was the primary language were also significantly less likely to be within a medical home (AOR: 0.69; P<.0001)—having an additive effect among first and second-generation children.

Conclusion: Generation nativity and household language are significant predictors of medical home access within the Hispanic/ Latino community, with first-generation children and those from Spanish-speaking households having the largest disparities compared to third-generation children. This demonstrates significant barriers for these children in obtaining complete medical care—and possibly even entry into the medical care system. Future research should focus on improving cultural and language training models for pediatric care providers in areas with higher rates of Hispanic/Latino immigrants.

Key Words: Immigration, Family-centered care, Pediatrics, Hispanic/Latino ethnicity/Medical home

Title: **Adverse childhood experiences and family planning—the impact of ACEs on contraceptive use and pregnancy intention, BRFSS 2022**

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Abstract

Introduction/Objectives: Adverse childhood experiences (ACEs), such as abuse, neglect and household dysfunction, are known to have lasting effects on mental, physical and behavioral health. Additionally, Protective and Compensatory Experiences (PACEs) have been shown to be a mediator in these relationships. However, little is known about how ACEs impact contraceptive use and pregnancy intention in adulthood. This study aimed to assess the relationship between ACEs and family planning, including contraceptive use and pregnancy intention.

Methods: We used the Behavioral Risk Factor Surveillance System to measure the impact of ACEs and PACEs on contraceptive use and pregnancy intention. To measure associations, we used design-based chi-square tests and regression models, adjusting for demographic and socioeconomic factors.

Results: The final sample size included 4,197 adult women from five states who completed both the ACE and Family planning modules. Most participants reported at least one ACE, and over a quarter reported four or more. Higher ACE scores were associated with higher use of any contraceptive method and lower reports of unintended pregnancy. Compared to women with 0 ACEs, those with 1-3 were significantly more likely to use contraceptives (AOR: 1.66; 95% Cl= 1.1-2.49). There was no significant difference in ACE score and pregnancy intention. However, PACEs were associated with contraceptive methods, ($P < 0.02$) with nearly thirty percent of those having no support structure as children reported having sterilization procedures.

Conclusion: Women with a history of multiple childhood traumas were more likely to use contraception—which may be due to wanting to discontinue the cycle of abuse. This highlights how early life trauma can affect health decisions. Further research should focus on the sociodemographic implications of contraceptive uses and access in relation to adverse childhood experiences.

Key Words: Pregnancy, ACES, PACES, Contraception

Title: Utilizing Virtual Reality as a Fitness Tool and Assessing Its Impact on Exercisers' Affective Response

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Abstract

Introduction/Objectives: Current national guidelines recommend at least 150 minutes of moderate-intensity aerobic activity weekly or at least 75 minutes per week of vigorous-intensity exercise in addition to two sessions of muscle-strengthening activities. Physical inactivity remains a prevalent issue despite these recommendations, illustrating a need for discovering and implementing strategies promoting patient adherence to a healthy lifestyle and exercise regimen. Our study evaluates the potential change in positive and negative affect after completion of exercise, as well as potential barriers to exercise faced by different communities and populations. This study also looks at the potential option of using a Virtual Reality (VR) headset as a reasonable, convenient, or accessible option for exercise.

Methods: This study involved the participation of 58 teenagers and adult volunteers. Informed consent was obtained, and participants performed an exercise of their choosing for ten minutes while using a VR headset. Exercise options included Walkabout Mini Golf, Gorilla Tag, Creed: Rise to Glory, and Fit Beat Combat. Meditative music and visuals were completed for ten minutes for participants randomly selected as controls. A self-reported PANAS questionnaire was completed by participants both before and after exercise to evaluate their affect over the previous week compared to after exercise completion. A general demographic survey and a Rate of Perceived Exertion (RPE) were also completed by each volunteer. All procedures in this study were approved by the OSU-CHS IRB to ensure compliance with ethical guidelines and protocols.

Results: Subjectively, 68.4% of male participants stated that they exercise regularly; however, only 52.6% of them actually met the national recommendation for weekly exercise. Similarly, 60.5% of female participants noted regular exercise subjectively, and an even lower percentage of females actually met the national recommendation for exercise within that population (34.2%). While both men and women had an increase in positive affect after exercise compared to before, men exhibited a greater increase in positive affect after physical activity, potentially illustrating a more beneficial outcome. Both men and women had a similar decrease in negative affect after exercising. The greatest barrier to exercise for both men and women was due to a lack of time. A greater percentage of women mentioned lack of motivation as a barrier to exercise compared to their male counterparts, and a greater percentage of men noted no barriers interfering with exercise practices.

Conclusions: Overall, statistical analysis shows that participants note feeling increased positive affect and decreased negative affect following exercise using a VR headset. A discrepancy between participants thinking they exercise an adequate amount versus doing so per national guidelines demonstrates a need for increased exercise education. It would be beneficial to evaluate how the removal of barriers to exercise may benefit the affect and overall health of different communities.

Keywords: Virtual Reality, Exercise, Affective Response

Title: The impact of social determinants of health on the age of autism diagnosis: An analysis of the National Survey of Children's Health

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Abstract

Introduction/Objective: Early identification of autism can make a drastic difference in the quality of life of children and their families with proper screening and tools. However, delays in the identification and diagnosis of autism at a later age may be linked to certain sociodemographics, social determinants of health (SDOH), and comorbidities. Thus, our primary objective was to determine the prevalence of poor SDOH among families with autistic children using data from the National Survey of Children's Health (NSCH), with a secondary objective to examine the impacts SDOH, comorbid mental health diagnoses, and geographical region, have on the age at which they received an autism diagnosis.

Methods: We performed a cross-sectional study using data from the NSCH to evaluate the prevalence of SDOH among those with and without autism and evaluate how SDOH impacts the age of diagnosis among a subsample of children aged 6 and over. To measure associations and differences, we conducted X^2 tests and used regression models, where applicable.

Results: Among the included participants, autism diagnoses were most prevalent among those aged 6-10, with males being significantly more likely to be diagnosed than females, and White and Hispanic children making up a majority of cases. While each adverse SDOH was more prevalent among children with autism, the presence of these SDOH did not reflect a delay in the age of diagnosis among children in the subsample, except for vaping in comparison to non-smoking households (+1.7 years [SE = 0.59, P = .004]). Children with Anxiety or ADHD comorbidities were diagnosed approximately two years later than those without (P<0001), and compared to the urban Northeast, most other regions showed a mean age of diagnosis more than 1 year later (P<05).

Conclusion: Autism diagnosis patterns are impacted by various demographic and clinical factors, and while adverse SDOH did not delay diagnosis, they were linked to greater barriers faced after diagnosis. These findings highlight ongoing inequities in autism identification and healthcare access, underscoring the need for targeted interventions to support affected children and adolescents.

Title: Adverse Event Reporting in Arrhythmia Therapy Trials

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Abstract

Background: Transparent adverse event (AE) reporting is essential for accurate risk-benefit assessment in arrhythmia therapy selection, yet discrepancies between trial registries and publications may distort safety perceptions and undermine clinical decision-making. This study evaluated the completeness and consistency of AE reporting in arrhythmia therapy trials by comparing ClinicalTrials.gov with corresponding publications.

Methods: We systematically compared data from ClinicalTrials.gov with corresponding publications for 173 cardiac arrhythmia interventional trials reporting results between 2009 and 2024. Using a pre-registered protocol (PROSPERO CRD420251081212), we extracted serious adverse events (SAEs), other adverse events (OAEs), and mortality from both sources. Analyses quantified discrepancies and temporal trends, while segmented regression evaluated the effect of the 2017 Final Rule on reporting practices.

Results: ClinicalTrials.gov consistently reported SAEs, OAEs, and mortality more completely than publications in both before and after the FR. SAE reporting was higher in the registry than in publications pre- and post-FR ($p < 0.001$). Publications were frequently underreported compared to the registry ($p <$ 0.001-0.005). Mismatches in affected patient counts were present in 86.1% of trials, mostly favoring the registry (75.2%), with discrepancies increasing post-FR (78.6% vs 94.0%).

Conclusion: AE reporting in arrhythmia trials remains inconsistent between ClinicalTrials.gov and publications, highlighting persistent transparency gaps that undermine accurate risk assessment and evidence synthesis. Harmonized reporting standards, mandatory registry-publication concordance checks, and stricter editorial enforcement are needed to improve safety data validity and strengthen evidence-based cardiology practice.

Keywords: Adverse events, clinical trial transparency, ClinicalTrials.gov

Title: MMR Coverage and Safety Trends in Children Aged 4–6: Public Health Implications for Measles Resurgence

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Abstract

Background: Despite previous eradication of measles in the United States, diminishing MMR vaccine rates have allowed for the resurgence of the disease. Although the MMR vaccine is safe and efficacious in preventing life-threatening disease, a growing number of families have delayed and declined immunizations. Our primary objective was to assess trends in MMR vaccination rates and subsequent adverse event reports to the FDA's Vaccine Adverse Events Reporting System (VAERS) for 4-6 year olds from 2014-2024.

Methods: We conducted a retrospective study analyzing data from the FDA VAERS and the CDC's VaxView from 2014 to 2024 for children 4-6 years old. Adverse event reports were classified as 'serious' if they included the following outcomes: hospitalization, death, life-threatening, or disabled. Descriptive statistics were conducted as well as Pearson correlations to assess changes in total MMR adverse events per 100,000 kindergarteners and serious adverse event reports per 1,000,000 kindergarteners over time.

Results: Administration rates of the MMR vaccine decreased from 94% to 92.5%, while the percentage of vaccine exemptions increased from 2.2% to 3.6%. Additionally, the number of general adverse event reports associated with the MMR vaccine declined from 12.52 to 11.70 per 100,000 ($R = .64$, $p = .0351$) while the serious adverse event reports declined from 4.05 to 2.38 per 1,000,000 ($R = .90$, $p = .0002$).

Conclusion: Our study demonstrates a steady decline in MMR vaccination rates over the past decade, accompanied by decreasing reports of both total and serious adverse events. Additionally, the number of total and serious adverse events reports related to the MMR vaccine have also declined. With the resurgence of the measles virus in the US, healthcare providers should discuss the benefits of MMR vaccination in the context of risks associated with the disease versus the small number of serious adverse event reports associated with the vaccine.

Keywords: MMR, public health, pediatrics

Title: **Exposure to Bioactive Chemicals from Native American Plants Preferentially Impacts Cellular Function in Pancreatic Ductal Adenocarcinoma Cells**

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Abstract

Introduction/Objectives: Pancreatic ductal adenocarcinoma (PDAC) is one of the most lethal malignancies in the United States, due to its aggressive progression, therapeutic resistance, and poor survival outcomes. Plant derived compounds used in Native American (NA) traditional medicines have recently gained traction due to their potential to regulate oxidative stress, inflammation, and mitochondrial function. Berberine, sulforaphane, curcumin, hydrastine (active compounds from goldenseal) and goldenseal (Hydrastis canadensis) root extract represent naturally occurring compounds with documented anticancer properties; however, their comparative effects on normal versus cancerous pancreatic cells remain incompletely characterized. This study aims to determine whether traditional NA plant constituents selectively impair PDAC cell function while preserving normal pancreatic cell integrity.

Methods: Normal pancreatic epithelial cells (HPNE) and PDAC cells (PANC-1) were maintained and dispensed into 96-well plates. PANC-1 (ATCC® CRL-1469™) and HPNE (ATCC® CRL-4023™) cells were maintained according to ATCC guidelines Cells were treated with plant-derived compounds at concentrations ranging from 0–100 µM or 1–100 µM, with select exposures at 20 µM or 20 µg/well, and incubated for 48 h at 37°C in a humidified atmosphere. Cellular metabolic activity, apoptotic signaling, and mitochondrial health were assessed using MTT, Apo-One™, and JC-10 assays. Statistical analyses were conducted using GraphPad PRISM (v11.0.0) via one-way or two-way ANOVA with Tukey's or Dunnett's post-hoc tests. All assays were performed with N=4 in duplicate and statistical significance defined as α=0.05.

Results: Plant-derived compounds induced concentration-dependent changes in metabolic activity in both normal pancreatic epithelial cells (HPNE) and pancreatic ductal adenocarcinoma cells (PANC-1). MTT analysis showed that berberine and goldenseal extract reduced metabolic activity in PANC-1 cells, while HPNE cells were less affected at lower concentrations. Curcumin decreased metabolic activity in both cell types in a dose-dependent manner, with greater sensitivity observed in PANC-1 cells. Sulforaphane created variable responses. Caspase 3/7 activity changed differently between PANC-1 and HPNE cells following 48 h exposure. In PANC-1 cells, berberine and sulforaphane reduced caspase activity, whereas curcumin and goldenseal extract increased caspase activation. HPNE cells exhibited minimal caspase change except at higher concentrations. JC-10 analysis showed greater mitochondrial dysfunction in PANC-1 cells compared to normal pancreatic cells following treatment.

Conclusion: The data indicates that plant-derived compounds exert compound-specific and cell-type-dependent effects on pancreatic cells. Berberine and goldenseal extract preferentially impaired PDAC cell metabolic activity, mitochondrial integrity, and apoptotic signaling, while normal pancreatic cells exhibited greater tolerance. These findings support further investigation of select plant-derived compounds as potential complementary approaches for pancreatic cancer research.

Title: **Withdrawal: An Early Morning Google Search Trend**

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Abstract

Introduction/Objectives: Substance use disorder is an increasing concern in the United States as more people experience withdrawal symptoms. With digital media being more accessible, the purpose of this study is to evaluate specific times of the day and weeks in the year when withdrawal and substance searches peak to compare with states' death mortality rates.

Methods: This study used a statistical analysis of Google Trends hourly and weekly relative search terms (RSI) for the terms *withdrawal*, *spins*, *crashing*, and *detox,* along with *fentanyl*, *cannabis*, and *alcohol* from January 1, 2024, to December 31, 2024. Data was extracted for each state and compared to the overdose mortality rate from the CDC.

Results: Statistically significant hourly RSI was highest at 2 AM for *withdrawal* and 6:00 PM for *spins*, *crashing*, and *detox*. *Fentanyl* was highest at 12:00 PM, *cannabis* at 5:00 AM, and *alcohol* at 1:00 PM. The weekly RSI for *withdrawal*, *detox*, and *alcohol* was highest the week of 12/29/2024. The Appalachian Region states had the highest rates of RSI and death rates, while Hawaii and the Great Plains states had the lowest. Search interest in *withdrawal* by state had a significant correlation with the overdose death rate (R =.44, *P* =.0011).

Conclusions: Advertisements for therapy services could be tailored to consumers by increasing advertisements in different states depending on the time of day and year when the terms peak. By displaying targeted advertisements during these times, people struggling with substance use disorder or withdrawal symptoms will hopefully seek help or answers to their condition.

Keywords: substance use disorder, withdrawal, infodemiology, relative search interest, Google Trends

Title: **Pigmented Villonodular Synovitis in the Division I Football Player: A Case Report**

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Oklahoma State University Center for Health Sciences, Tulsa, OK (MR, AM AJ)

Abstract

Background: Pigmented villonodular synovitis (PVNS) is a rare benign proliferative disorder of the synovial lining of joints. It is an extremely aggressive condition that mainly affects young adults. PVNS mostly affects the knee and can be classified into two categories: localized and diffuse. This disease can affect any synovial joint, but it is most common in the knee (73-75% of cases) and hip. It can present similarly to other knee pathologies, especially in athletes, so early diagnosis and management can help to preserve function, athletic progression, and career longevity.

Case presentation: A 17-year-old college football prospect presented to the clinic due to worsening mechanical catching in his right knee during track season. An initial magnetic resonance imaging (MRI) scan showed a meniscus tear and anterior cruciate ligament (ACL) irritation. The patient's knee was surgically scoped to repair the meniscus; however, 6 months later, he returned with the same symptoms. An MRI obtained at this time showed marked synovitis, so another knee arthroscopy was planned to perform a synovectomy, at which time a biopsy of the tissue was taken. Following this, the patient enrolled at his Division I university and started on the football team. During this time period, he underwent another surgery at an outside facility and was diagnosed with PVNS. A year after the patient's initial clinic visit, he returned to the clinic to undergo a complete synovectomy of the anterior and posterior compartments of the knee.

Discussion: PVNS can be hard to diagnose in young athletic populations due to the fact that it can initially present similarly to common sports-related injuries. Arthroscopic approaches to management can help facilitate faster return to play in the athletic population; however, they may be associated with higher recurrence rates. There are emerging treatment options for PVNS, such as radiosynoviorthesis and biologic agents, that can be used in severe treatment-resistant cases. These factors underscore the importance of maintaining a high index of suspicion for PVNS in young athletes with persistent joint symptoms and adopting an individualized, multidisciplinary treatment approach to balance return-to-play goals with recurrence risk.

Keywords: pigmented villonodular synovitis, college athlete, knee arthroscopy

Title: **Characteristics, Imaging Modality, and Outcomes of Skeletal Injuries in the Emergency Department Using NHAMCS**

Authors: *ML Reese; JW McAlester; MLC Nolan; J Zabel; A Cain; M Hartwell*

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Abstract

Purpose: Sports-related injuries are a common cause of ED visits, often requiring specialized intervention by orthopedic surgeons. Many of these injuries include skeletal involvement. Skeletal injuries are occasionally accompanied by limb-threatening injuries requiring accurate triage and quick intervention. The purpose of this study was to understand the characteristics of skeletal sports-related injuries based on triage level using ICD-10 codes, with a secondary purpose of evaluating pain score and wait times regarding injury, anatomical location, and triage level.

Method: Using the 2021 National Hospital Ambulatory Medical Care Survey (NHAMCS), ICD-10 codes starting with "S" and activity "Y93" at the time of injury were included. Injury location, triage level, hospital geography, patient demographics, imaging, and obesity status were also described.

Results: 1,228 sports-related skeletal injury ED visits were included. Older adults (18.8%), obese patients (28.4%), and patients who received imaging were associated with higher triage levels. Injuries to the head (44.0%), neck (30.5%), thorax (15.6%), and shoulder (8.0%) were also associated with higher triage levels. Lower pain levels were associated with nonurgent triage levels (CI = -3.94 (-6.15 - -1.72); *P* = .001), and anatomical location was not significantly associated with pain score. Wait times were not significantly associated with anatomical location or triage level.

Conclusion: This analysis aids in the identification of high-risk populations for sports-related skeletal injuries, providing insight into who may require specialized care and triage to mitigate morbidity and mortality. Through these specialized diagnostic and treatment methods, resources can be better allocated to best serve these populations.

Title: **Opioid Prescribing Patterns for Orthopedic Injuries in the Emergency Department**

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Introduction/Objectives: A study in 2017 showed that nearly 500,000 individuals died due to opioid drug overdose since 2000. There has been a growing interest in the amount of narcotic analgesics that are prescribed as well as the reason they are deemed necessary. These severe consequences have made opioid prescribing a predominant issue that must be studied further. Moreover, the relationship between opioid prescriptions and ortho-skeletal injury warrants further investigation. The objective of this study is to determine the role that anatomical location in ortho-skeletal injury may play in the prescribing patterns of opioid analgesics in the Emergency Department.

Methods: A data analysis was conducted of the 2021 National Hospital Ambulatory Medical Care Survey, which looks at a multitude of variables regarding ED visits. To be included in the study, patients must have had a skeletal injury as their primary, secondary, or tertiary diagnosis based on ICD-10 codes. Then, patients were separated into “yes” or “no” categories based on whether they received an opioid while in the Emergency Department. Pain locations were then broken into anatomical regions to determine if certain anatomical regions received opioids at higher rates than others. The study also looked at any possible differences in geographical location, hospital admission rates, length of stay, pain scale, and repeat ED visits within 72 hours.

Results: Results showed that of the 10536 individuals who were seen for skeletal issues, the most commonly reported regions were Head, Hand/Fingers, and Knee/Leg. However, when looking at only the individuals who received opioids, the most common regions to receive opioids were Hip/Thigh (37.1 %), Thorax (30.0%), and Shoulder (25.2%). Data showed that there was no statistically significant difference in opioid prescribing rates based on geographical location and return ED visits. However, data showed that hospital admission rates, LOS, and pain scale were likely to be increased for patients who received opioids while in the ED.

Conclusions: Despite head, hand/finger, and knee/leg skeletal injuries being most common, opioid prescribing was highest for hip/thigh, thorax, and shoulder injuries, suggesting prescribing may be influenced by perceived injury severity or pain complexity rather than injury frequency. Patients receiving opioids had higher admission rates, longer length of stay, and higher pain scores, likely reflecting confounding by indication, though potential negative impacts of opioids on recovery cannot be excluded. The absence of geographic variation in prescribing contrasts with prior literature and, when combined with evidence showing limited benefit of opioids over Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and risks of prolonged use, supports continued efforts to limit opioid prescribing for musculoskeletal injuries in the ED.

Keywords: opioids, skeletal injuries, emergency department, geographic region

Title: Source Reliability of Artificial Intelligence–Generated Responses to Emergency Medicine FAQs: A Cross-Sectional Evaluation

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Abstract

Introduction: Responses to frequently asked questions (FAQs) that are created by Artificial Intelligence (AI) are becoming increasingly prevalent for patients seeking information related to emergency care. As tools such as ChatGPT and Google Gemini become more integrated into healthcare information, the quality, transparency, and patient-centeredness of AI-generated emergency medicine content require systematic evaluation.

Methods: In this study, we conducted a cross-sectional evaluation of AI-generated answers to FAQs related to emergency medicine using two widely available large language models: ChatGPT and Google Gemini. On a predetermined date, each platform was instructed to produce its 20 most commonly asked emergency care questions along with corresponding responses and cited online sources. Questions were classified by type according to Rothwell's framework, and sources were categorized by website type. Source transparency was evaluated using the Journal of the American Medical Association (JAMA) benchmark criteria, informational quality was assessed with the Brief DISCERN tool, and patient-centeredness was measured using the Patient Education Materials Assessment Tool (PEMAT). Readability was assessed using Flesch Reading Ease and Flesch–Kincaid Grade Level indices. Results were summarized descriptively and compared across AI models.

Results: Forty emergency medicine–related FAQs were analyzed (20 per model). ChatGPT generated more policy questions than fact questions (Policy 65.0%, Fact 35.0%), whereas Gemini generated predominantly fact questions (Fact 75.0%, Policy 25.0%); no value-based questions were identified for either model. Across JAMA benchmark components, ChatGPT more frequently met disclosure (90.0% vs 50.0%), attribution (50.0% vs 35.0%), and authorship (35.0% vs 30.0%) criteria than Gemini, with similar currency (75.0% vs 70.0%); mean total JAMA scores were modest for both models (ChatGPT 2.50±1.28; Gemini 1.85±1.46), and 25.0% of responses in each model met "good" transparency (JAMA >3). Patient-centeredness differed by platform: Gemini demonstrated higher PEMAT understandability (71.8%±21.6 vs 45.6%±22.4) and higher PEMAT total scores (57.8%±19.6 vs 36.7%±20.8), while actionability remained low for both (22.5%±34.3 vs 15.0%±28.6).

Conclusions: AI-generated emergency medicine FAQs showed modest transparency and limited actionability, with readability generally above recommended patient levels. Gemini responses were more understandable (higher PEMAT understandability and total scores), whereas ChatGPT more consistently met several JAMA transparency components (notably disclosure and attribution). Overall, these tools may help orient patients to ED-related concepts, but gaps in transparency and actionable guidance—particularly in time-sensitive contexts—support the continued need for clinician guidance and improved standards for patient-facing AI outputs.

Title: Microbial and Molecular Correlates of Morgellons Disease

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Abstract

Morgellons Disease (MD) is a rare, mysterious illness that generates controversy in the medical community [1-16]. These contentions stem from difficulties in diagnosis, as MD symptoms overlap with an unusual psychiatric disorder, most notably delusional infestation (DI). DI is a fixed, false belief of infestation by animate or inanimate pathogenic entities, despite medical or microbial evidence to the contrary [1-16, 19]. MD patients who exhibit or report lesions containing fibers are often dismissed as having DI, and their physiological symptoms are frequently disregarded. Consequently, MD patients are treated with antipsychotic medications, labeled with DI without an appropriate psychiatric evaluation, and denied examinations for an underlying microbial infection that may cause a filamentous dermopathy [3, 8].

At this time, the etiology and transmission of MD remain unknown, and diagnostic criteria have yet to be established [4, 5, 10, 16]. This is detrimental to patients, as the dispute surrounding MD is substantial [8]. The hallmark feature of MD is the presence of microscopic and near-microscopic fibers visible within the cutaneous and subcutaneous layers of the skin [1-5, 7-11, 13, 17-19]. These fibers range in a multitude of colors, including red, blue, black and white, and are accompanied by unusual filamentous inclusions and projections found in spontaneous, slow-healing, or non-healing lesions [1-5, 7, 9-11, 13-18, 20]. Although the origin of fiber coloration is not fully understood, fiber-like filaments are perceived to result from the overproduction of keratin and collagen, with blue filaments containing granules of melanin [3, 7-11, 15, 17, 18]. Analyses from past research have yielded varied causations to production [2, 3, 5-8, 16, 18]. The signs and symptoms of MD include skin lesions, crawling sensations, fatigue, cognitive difficulties, behavioral effects, and fibers [1, 3, 11, 15, 19]. Additional symptoms may include Lyme-like manifestations such as musculoskeletal, neurological, and cardiovascular involvement [3, 8-11, 14-16].

This study aimed to address critical gaps by bridging the methodological limitations of earlier studies, to reduce stigma and skepticism surrounding MD, and to stimulate broader scientific engagement. While this investigation does not establish causality, the study explored the potential associations between pathogens such as *Bartonella henselae*, *Borrelia burgdorferi*, *Helicobacter pylori*, and *Treponema denticola* within MD lesions.

The goal was to support a biological and infectious basis for MD, rather than a solely psychiatric explanation. By using defined clinical criteria for MD, along with reproducible microbial and molecular techniques, this study generated evidence of the presence of pathogens in affected MD tissue. These findings contribute to a growing body of literature supporting MD as a legitimate physiological condition and challenge the psychiatric-only perspective.

This research may contribute to future clinical protocols; particularly in differentiating MD from psychiatric conditions such as DI, and promote a more accurate classification, diagnosis, and treatment strategies for MD.

Title: Prenatal exposure to fentanyl induces behavioral alterations in adolescent mice

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Abstract

Introduction/Objectives: Opioid in pregnancy is associated with neonatal opioid withdrawal syndrome (NOWS) leading to lifelong neurobehavioral deficits. There has been an exponential increase in the distribution of the synthetic and highly potent opioid, fentanyl. There are limited studies suggesting that prenatal exposure to fentanyl may alter fetal growth and morphogenesis in the postnatal period.

Here, we describe and behaviorally characterize a novel model of perinatal fentanyl exposure by mixing the fentanyl in condensed milk and by administering the pregnant mouse dams till PND9.

Methods: The experiments were conducted in C57/BL6 mice strain. Two treatment groups were used for the experiments: vehicle and fentanyl treatment. Pregnant dams were treated with vehicle or 0.15 mg/kg fentanyl between E6-PND9. After PND9, the moms and the pups for both groups were returned to new cages until weaning at P21. The offsprings were weighed till PND9. The animals were tested in adolescent P26-P30 for a battery of behaviors- open field, novel object recognition, social preference and hot plate test. The animals were euthanized; brain regions and sciatic nerves were collected for further molecular analysis.

Results: Our results show behavioral deficits in the form of elevated anxiety (increased central entries and time spent in the center) in the open field test. Our data also shows increased sensitivity to thermal pain in the hot-plate test. We further aim to look at the sex differences by increasing the sample size and investigate molecular mechanisms underlying these behavioral aberrations.

Conclusions: We observed behavioral deficits in the form of elevated anxiety and altered analgesic response in the adolescent animals prenatally treated with fentanyl.

Keywords: prenatal, fentanyl, adolescent

Title: Assessing the Completeness of Adverse Event Reporting in Clinical Trials of Psoriasis Treatments: A Registry-Publication Comparison Study

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Abstract

Background and Objectives: The interventional landscape for psoriasis has expanded considerably with the introduction of systemic and biologic agents, intensifying the importance of comprehensive adverse event(AE) documentation to inform safe clinical practice. While regulatory initiatives such as the FDAAA Final Rule(Final Rule) were designed to enhance clinical trial transparency, disparities between AE data presented in ClinicalTrials.gov and peer-reviewed literature continue to occur, depriving dermatologists of reliable information for patient counseling and treatment decision-making. Variability in how serious adverse events(SAEs), AEs, deaths, and treatment discontinuations due to AE are documented can distort safety perceptions and influence clinical practice. This investigation assesses the completeness and agreement of AE documentation in psoriasis clinical trials through comparison of ClinicalTrials.gov registry entries with their corresponding published reports.

Methods: We performed a cross-sectional analysis using systematic retrieval of psoriasis trials from ClinicalTrials.gov with results posted between 2009 and 2024. Data on AEs–encompassing SAEs, OAEs, treatment discontinuation due to AE, and deaths–were independently abstracted by two reviewers, with disagreements resolved through adjudication. Trials were categorized according to FDA regulatory status, and variations in AE documentation were examined using descriptive statistics, chi-square tests, Bland-Altman and funnel plots, and regression modeling.

Results: The study's primary endpoint was completeness and agreement of AE documentation between ClinicalTrials.gov and corresponding peer-reviewed publications across four predefined domains: SAEs, OAEs, discontinuation due to AE, and death. Registry entries contained more complete AE information than published articles. Although death documentation in registries showed improvement after the rule's enactment, publications demonstrated persistent inconsistency. Following implementation of the FDAAA Final Rule, SAEs were present in 53% of registry records versus 40% of publications. OAEs were captured in 51% of registries but only 22% of publications. Disparities in SAE totals occurred in over 90% of trials, frequently with registries recording higher counts. Numerous discrepancies stemmed from incomplete calculations, ambiguous characterizations, or AE information confined to narrative text. Both visual and statistical assessments revealed a pattern of underreporting in publications, with minimal temporal improvement irrespective of trial scale or sponsorship type.

Conclusion: Notwithstanding current regulatory frameworks, AE documentation for psoriasis trials remains fragmented with substantial inconsistency between registry and published data. These shortcomings undermine rigorous safety assessment and evidence-based clinical recommendations. Improved patient care requires increased integration of registry data into evidence synthesis, better clarification of AE definitions, and standardized AE reporting practices.

Registration*:* Preregistered on PROSPERO and Open Science Framework

Title: Do Frequently Asked Patient Question and Answer Resources for Hip and Knee Arthroplasty differ between popular Large Language Models?

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Abstract

Introduction/Objectives: Large language models (LLMs) such as ChatGPT and Google Gemini are increasingly used by patients to obtain medical information, including guidance related to hip and knee arthroplasty. Given their widespread adoption and influence on patient decision-making, it is critical that these platforms provide accurate, transparent, and readable information derived from credible, peer-reviewed sources. However, the quality, source credibility, transparency, and patient-centeredness of LLM-generated responses to frequently asked arthroplasty-related questions remain poorly characteried.

Methods: A cross-sectional analysis of hip and knee arthroplasty–related FAQs generated by ChatGPT and Google Gemini was performed. FAQs were classified using Rothwell's framework, while source transparency, information quality, and answer understandability and actionability were assessed using the JAMA Benchmark Criteria, Brief DISCERN, an adapted PEMAT-P, and FRES/FKGL scores, respectively.

Results: Forty arthroplasty-related FAQs were analyzed (20 per platform), with most questions classified as fact-based for both ChatGPT (55%) and Google Gemini (65%). Google Gemini demonstrated higher transparency and information quality than ChatGPT, with higher mean JAMA Benchmark scores (2.40 vs 1.25) and Brief DISCERN total scores (26.7 vs 24.1). Overall understandability was moderate for both platforms, while actionability remained low across models (≤25%) based on PEMAT assessment. Gemini responses were more readable than ChatGPT responses, with lower mean Flesch–Kincaid grade levels (10.9 vs 14.2), and government-sourced websites demonstrated the highest transparency scores among cited sources ($p < 0.05$).

Conclusions: Among widely used AI platforms, Google Gemini demonstrated higher transparency, information quality, and readability than ChatGPT for hip and knee arthroplasty–related FAQs; however, both platforms showed limited actionability and inconsistent transparency across cited sources . Given the growing reliance on LLMs for medical information, these findings highlight the need for improved sourcing transparency, clearer actionable guidance, and the use of credible, peer-reviewed references to support patient education in arthroplasty care.

Keywords: hip arthroplasty, knee arthroplasty, large language models, patient education, artificial intelligence

Title: **Silent Shifts: Outcome Changes in Depression Trials**

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Abstract

Background: Reporting outcome changes is a persistent concern in clinical research, especially in psychiatry where outcomes can be nuanced and subjective. Even though regulations like the FDAAA Final Rule minted into standardized transparency, there are still gaps in reporting that can negatively impact clinical decision making.

Methods: We conducted a cross-sectional study of 44 FDA-regulated interventional clinical trials for depressive disorders, with start dates between 2017 and 2024, registered on ClincialTrials.gov. Utilizing the registry's version history, we cross-referenced the initial outcome specifications with the most recent changes, evaluating the scale of change and if the reasons for these changes were disclosed. Outcome modifications were classified according to type, timing, and interpretive impact.

Results: All trials had at least one outcome modification, with 97.7% meeting the criteria for a high-impact change. Most changes were made post-primary completion, and none of the modifications were disclosed in corresponding publications. Primary outcomes were often reformatted from broad to specific, while secondary outcomes experienced a higher total of changes per trial. Reframed and reorganized outcomes can raise concerns about transparency, potential bias, and effectiveness of current regulatory oversights, especially considering the frequency of changes to primary and secondary outcomes.

Conclusion: These systematic issues in trial outcome reporting may hinder accurate clinical decision making and highlights the need for improved regulations for outcome disclosure standards.

Keywords: Outcome reporting, depression, modifications

Title: Association Between Vision Correction and Educational Outcomes in School-aged Children With ADHD: A Cross-Sectional Analysis

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Abstract

Introduction/Objectives: Attention hyperactive deficit disorder (ADHD) and refractive error are two conditions that many children are living with worldwide. Both of these conditions, if left untreated, can lead to long-term poor outcomes. Thus, the primary objective of this study is to examine whether spectacle correction among school aged children with impaired vision and ADHD impacts educational outcomes using data from the National Survey of Children's Health (NSCH).

Methods: This study performed a cross-sectional analysis of the 2021-2023 NSCH data to assess spectacle correction among school aged children with impaired vision and ADHD and their educational outcomes by sociodemographic factors using X^2 and regression models.

Results: In a nationally representative sample (N = 15,598), 7.6% of children had a parent-reported ADHD diagnosis. Children within the youngest age group (ages 2–5) had the highest lens use (64.3%) compared to older children ($\chi^2 = 19.66$, $p < .001$), and insured children were more likely to receive lenses ($\chi^2 = 5.18$, $p = .023$). In preschoolers (ages 2-5) with ADHD, corrective lens use was associated with greater task persistence ($\beta = 0.91$, $p = .012$) and lower frequency of smiling/laughing ($\beta = –0.41$, $p = .033$). In school-aged children with ADHD (ages 6-10), corrective lenses were linked to improved emotional regulation ($\beta = 0.23$, $p = .050$). Adolescents (ages 11-17) with ADHD and corrective lenses, displayed increased emotional self-regulation when faced with a challenge ($\beta = 0.19$, $p = .047$).

Conclusions: Our results highlighted that in children with ADHD and refractive error, vision correction was shown to have an impact on educational outcomes in comparison to those without correction. Most notably, the preschool-aged children showed a significant increase in task persistence- while the other age groups had smaller gaps between corrected and uncorrected vision impacting educational outcomes.

Keywords: ADHD, Vision, Education

Title: **Liver Proteomics Analysis Has Identified RPS4X as a Gender-Based Ribosomal Biomarker in Hepatitis C Virus-Related Cirrhosis**

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Abstract

Introduction/Objectives: Hepatitis C virus (HCV) infects millions of people across the globe and is a leading cause of liver cirrhosis and hepatocellular carcinoma (HCC). Studies demonstrate that chronic HCV infections prevail more and progress faster to cirrhosis and cancer development in males as compared to females. In contrast, there is an association with less-severe disease of HCV infection throughout all of its stages in pre-menopausal females and women on hormone replacement therapy. Therefore, sex-based biomarkers need to be investigated in the role of HCV progression. We were interested in a gene on the X-chromosome, Ribosomal Protein S4, X-Linked (RPS4X), as it encodes for a portion of the 40S ribosome which is essential for protein synthesis. Estrogen Receptor (ER) signaling is a known regulator of inflammation and immunity, and it is possible that chronic inflammation due to HCV infection in the liver may alter expression of RPS4X. Multiple studies demonstrate that upregulation of this protein is linked to a variety of cancers due to promotion of stemness and metastasis. However, its possible role in sex-based differences in HCV-induced cirrhosis and HCC has not been well explored. This study aims to assess the sex-based differential expression of RPS4X and its potential role as a biomarker in HCV-induced cirrhosis and HCC progression.

Methods: Our current study utilized proteomic analysis to determine sex-based differences in RPS4X protein expression amongst males and females with HCV-cirrhosis and HCC. 65 (healthy, cirrhosis, HCC) male and female liver tissues were obtained from the NIH Liver Tissue Bank after undergoing DIA proteomic analysis. Immunohistochemistry verified RPS4X expression in these tissues and Image Analysis was performed.

Results: HCV-cirrhosis females had a significant upregulation in expression of RPS4X compared to HCV-cirrhosis males and in contrast HCV-cirrhosis males showed significant downregulation compared to control males. No significant differences in protein expression between control males and control females were observed. Both HCC males and HCC females had comparable expression between themselves and their respective controls.

Conclusions: RPS4X protein is significantly upregulated in HCV-cirrhosis females compared to HCV-cirrhosis males. While many genes get inactivated on one of the X chromosomes in females, RPS4X is notable for escaping this inactivation via unknown mechanisms while responding to virus infection in females. Although to the best of our knowledge there is not a link right now between RPS4X and estrogen, our findings do indicate that RPS4X is a disease biomarker for HCV-cirrhosis.
Keywords: Hepatitis C virus, cirrhosis, hepatocellular carcinoma, gender, RPS4X

Title: **Successful Management of Spasticity with Dantrolene: A Case Report**

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St. Francis Hospital Rehabilitation

Abstract

Background: Spasticity in patients with incomplete tetraplegia is characterized by involuntary, velocity-dependent increase in muscle tone with exaggerated stretch reflexes due to a disruption of the upper motor neuron pathways. Management is important because problematic spasticity can persist for years with ongoing functional limitations. Dantrolene is used in cases of chronic spasticity due to upper motor neuron disorders for skeletal muscle relaxation by inhibiting calcium release from the sarcoplasmic reticulum via antagonism of the ryanodine receptor.

Case Presentation: Our patient is a 55-year-old male that experienced severe central canal stenosis at C5-6 with associated myelomalacia of the spinal cord after a fall, causing incomplete tetraplegia. Following this initial fall, an anterior cervical discectomy and fusion was performed. After inpatient rehabilitation for 4 weeks, he was discharged home. About five months later, this patient fell again and was found to have an acute nondisplaced fracture through the calcified and fused ligamentum flavum at C7-11. He then underwent cervical posterior laminectomy with fusion.

During his inpatient rehabilitation stay, his home regimen of tizanidine (8mg TID and 4mg Q6h PRN) was resumed, but this showed no improvement in his spasticity. He was then switched to dantrolene (25mg BID), while reducing the tizanidine to 6mg TID during the introduction of the new medication. After showing improvement, the dantrolene was initially increased to 50mg BID 2 days after initiation, then 50mg TID 6 days after initiation, and finally 75mg TID 8 days after initiation. While on dantrolene, his liver function tests remained within normal limits. Compared to his pre-dantrolene baseline, the patient showed improvement across all categories of functional ability and required physical assistance.

This patient was lost to follow up with the PM&R department outpatient, but there is record that he followed up with his primary care physician and outpatient PM&R for Botox for spasticity. There is a note that states he switched back to Tizanidine due to difficulty getting Dantrolene from his pharmacy. Although we are unsure of his current tone status, while on dantrolene, this patient showed improvement, especially in adductor tone.

Conclusions: Dantrolene was the drug of choice for this patient because baclofen had failed previously, the maximum dose of tizanidine was not effective for the worsened spasticity, diazepam was not recommended due to his chronic oxycodone use, and the hospital did not cover inpatient Botox. This case highlights dantrolene as a valuable option for refractory spasticity when other agents are ineffective or not tolerated.

Keywords: dantrolene, spasticity management, inpatient rehabilitation

Title: **Case Report: Treatment of a Patient with Schizophrenia with Catatonia with Abilify Asimtifii™ (Aripiprazole) Long Acting Injectable**

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Abstract

Introduction/Objectives: We report the treatment of a 24-year-old female with a diagnosis of schizophrenia with catatonia, characterized by delusions and disorganized thought processes. She was initially admitted to a psychiatric hospital following an episode of aggression. Upon admission, the patient was noncompliant with interviews and physical examinations. Throughout her hospitalization, she was trialed on multiple antipsychotic medications and demonstrated poor adherence to treatment.

Aripiprazole is a second-generation antipsychotic indicated for the treatment of schizophrenia and other psychiatric disorders. Given the frequent need for medication trials and the high risk of nonadherence in this population, long-acting injectable formulations may offer a therapeutic advantage. Long-acting injectable aripiprazole provides sustained dopamine and serotonin modulation, which may reduce relapse risk associated with inconsistent medication use. This case highlights the clinical utility of long-acting injectable aripiprazole in a patient with schizophrenia and a history of medication nonadherence.

Methods: This case report is over a single patient at an inpatient psychiatric hospital. Diagnosis of Schizophrenia with catatonia was made by a psychiatrist based on the DSM-5-TR, interviews, and collateral history. Treatment included pharmacologic and daily psychiatric interviewing if the patient was willing. The patient was started on 960 mg of Abilify Asimtifii™ for the initial injection dose. Clinical response was monitored through serial psychiatric evaluations, progress notes from staff, and observation in the unit.

Results: Patient was started on bi-monthly Abilify Asimtifii™ long-acting injectable treatment. Following the initial injection we began to see improvements in the patient's catatonic symptoms. On day one post-injection, the patient no longer lay on the floor. Prior to the injection the patient was exhibiting mutism but began to ask for things two days after the injection. By day four, the patient began walking around the common areas. Overall this treatment has demonstrated positive clinical response for a patient who has been non-compliant with previous oral medications.

Conclusions: This case report highlights the utilization of Abilify Asimtifii™ in a patient with schizophrenia with catatonic features. The study aims to show the clinical usefulness in using long acting injectables for psychiatric patients with schizophrenia with catatonia.

Keywords: Schizophrenia, Antipsychotics, case report

Title: Demographic and Clinical Factors Associated with Falls and Fall-Related Fractures using NHIS

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Abstract

Background: Fall related injuries are common in the older adult population and are associated with various chronic medical conditions. Visits to the emergency department (ED) place a significant financial burden on both the patient and healthcare system. This paper aims to explore the demographics associated with fall-related fractures, with a secondary goal of identifying comorbid conditions that are also associated with fall-related fractures.

Methods: We conducted a data analysis of the 2024 National Health Interview Survey (NHIS) to identify individuals reporting a significant injury that occurred due to a fall in the past three months, who responded affirmatively to having a fracture, and who either had visited the emergency department (ED) or were hospitalized overnight. Demographic variables and comorbidities were evaluated to assess increased risk associated with falls and severity.

Results: A total of 1090 individuals were identified as having falls—680 that resulted in no fractures nor hospital visit, 75 with fractures but no hospital visit, 212 with hospital visit but no fracture, and 123 that resulted in fractures and hospitalization or ED visit. Significant associations were found between severity of injury and comorbidities of diabetes, heart disease, and dementia ($P<.05$).

Conclusions: A majority of individuals that visited the ER with a broken bone due to a fall also had a diagnosis of arthritis (46%). Arthritis can be extremely painful for patients and significantly limits mobility and overall ability. Additionally, almost 20% of individuals that visited the ER with a broken bone due to a fall were also diagnosed with diabetes and another 16% had a cancer diagnosis. These three disease processes are extremely debilitating, painful, and destructive to overall bone composition and strength. If these patients can be well managed with medications, exercise and other therapies to help lessen the destructive nature of these pathologies and maximize bone strength. This is imperative for decreasing ER visits due to a fracture from a fall.

Keywords: falls, fall-related fracture, dementia, heart disease

Title: Exploring the Relationship Between Age at Menarche and Long-Term Health Outcomes

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Abstract

Introduction/Objectives: Age at menarche is associated with long-term health outcomes, yet its relationship with adult health across the lifespan remains understudied. Therefore, we examined associations between age at menarche and metabolic and depressive outcomes across adulthood using nationally representative survey data.

Methods: We performed a cross-sectional analysis of data from the National Health and Nutrition Examination Survey (NHANES). Female participants aged 18 years and older were included. Respondents were stratified into four age groups: 18–24, 25–39, 40–59, and 60 years or older. Age at menarche was classified as early (7–10 years), on time (11–14 years), or late (≥15 years). Outcomes included plasma fasting glucose values and depressive symptoms measured using the DPQ screener, with comparisons conducted within each age group.

Results: Mean glucose levels differed significantly by menarche timing among women aged 40 to 59 years, with higher glucose values observed in those with early menarche compared with on time and late menarche groups (P = .004). No statistically significant differences in glucose levels were observed across menarche timing groups in the 18 to 24 year, 25 to 39 year, or 60 years and older cohorts. DPQ screener scores also differed by menarche timing in the 40 to 59 year group (P = .018) and among women aged 60 years and older (P = .034). Rates of DPQ scores of 10 or higher were significantly different by menarche timing in the 40 to 59 year group (P = .001).

Conclusions: Age at menarche was associated with metabolic and depressive outcomes primarily during midlife, with early menarche linked to higher plasma fasting glucose and greater depressive symptom burden among women aged 40 to 59 years. Age at menarche may therefore serve as a marker for identifying women at increased risk for adverse metabolic and psychological outcomes in mid to late adulthood.

Keywords: Women's health, Psychology, Metabolic

Title: Regional and Socioeconomic Determinants of Atopic Dermatitis in the United States: A Cross-Sectional Analysis of the 2022 National Health Interview Survey

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Abstract

Introduction/Objectives: Atopic dermatitis (AD) is a chronic inflammatory skin condition influenced by genetic, environmental, and socioeconomic factors. Regional variation in air pollution, humidity, water quality, and UV exposure may contribute to disparities in AD prevalence and diagnosis. This study aimed to examine associations between geographic region, occupational industry, and sociodemographic characteristics with self-reported AD diagnosis in U.S. adults.

Methods: We conducted a cross-sectional analysis using data from the 2021 National Health Interview Survey (NHIS). Adults aged 18 and older who reported a skin allergy and responded to the AD diagnosis prompt were included. Variables analyzed included geographic region (Northeast, Midwest, South, West), urban-rural classification, income-to-poverty ratio (IPR), education level, occupation, age, sex, and race/ethnicity. Multivariable logistic regression assessed adjusted associations with AD diagnosis.

Results: Among 29,431 respondents, 10.75% reported a skin allergy, and 68.5% of those reported receiving an AD diagnosis. Diagnosis rates increased with educational attainment (59.2% in the least educated vs. 74.0% in the most educated; $P < .0001$) and IPR ($P = .0015$). Women had higher prevalence (12.6%) and diagnosis rates (70.9%) than men (8.8% and 64.8%, respectively; $P < .01$). Racial disparities were observed: non-Hispanic Black (11.3%) and multiracial (16.7%) adults had higher prevalence, while Hispanic (56.4%) and Asian (58.5%) adults had lower diagnosis rates ($P < .0001$). Compared to the Northeast, adults in the Midwest (AOR = 0.59), South (AOR = 0.64), and West (AOR = 0.60) had lower odds of diagnosis. Occupations in healthcare, education, and retail were associated with higher prevalence.

Conclusions: Significant disparities in AD diagnosis exist across region, race, income, education, and occupation. Adults outside the Northeast and those from underserved groups likely face barriers to diagnosis. Findings underscore the need for regionally targeted interventions and improved access to dermatologic care.

Keywords: dermatology, region, atopic dermatitis

Title: Disparities in Melanoma: an Analysis of the 2022 Behavioral Risk Factor Surveillance System Data

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Abstract

Introduction/Objectives: Melanoma accounts for the majority of skin cancer-related deaths despite comprising only a small percentage of skin cancer diagnoses. Early detection is critical, but disparities in access to dermatologic care can delay diagnosis and worsen outcomes. This study used the PROGRESS-Plus framework to evaluate sociodemographic disparities in melanoma and non-melanoma skin cancer diagnoses using the 2022 Behavioral Risk Factor Surveillance System (BRFSS).

Methods: We performed a cross-sectional analysis of the 2022 BRFSS dataset, including participants aged 40 and older who reported on melanoma or non-melanoma skin cancer diagnoses. The PROGRESS-Plus framework was applied to assess disparities by place of residence, race/ethnicity, occupation, gender, education, socioeconomic status, and other social determinants. Chi-square (X^2) tests and adjusted analyses were used to evaluate associations between skin cancer type and demographic variables.

Results: Of 276,433 respondents (representing ~140 million U.S. adults), 0.67% reported melanoma (n = 2,621), and 1.43% reported non-melanoma skin cancer (n = 6,136). Melanoma prevalence was higher among rural residents, males, veterans, retired individuals, and those with higher income and lower BMI. Non-Hispanic White individuals had the highest rates of both melanoma (0.96%) and non-melanoma cancers (2.23%). Higher income was consistently associated with increased melanoma prevalence, while non-melanoma cancers were more evenly distributed across income groups.

Conclusions: Significant disparities in skin cancer diagnosis exist across multiple sociodemographic factors. Individuals in rural areas, those with higher income, and non-Hispanic Whites had greater reported melanoma prevalence, likely reflecting differences in healthcare access and utilization. Interventions such as teledermatology, community education, and integration of screening in primary care may help reduce barriers and promote earlier detection in underserved populations.

Keywords: melanoma, non-melanoma, sociodemographic

Title: Does the Bridge-Enhanced ACL Reconstruction Have Improved Functional Outcomes Compared to Traditional ACL Reconstructions?: A Critically Appraised Topic

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Abstract

Clinical Scenario: The traditional anterior cruciate ligament (ACL) reconstruction using an autograft has been the gold standard of ACL reconstructions. The introduction of the Bridge-Enhanced ACL reconstruction (BEAR) has allowed for ACL reconstructions with no need for a patient graft. This alternative procedure may allow for a more streamlined rehabilitation process by focusing solely on the ACL reconstruction with no rehabilitation of graft sites needed.

Clinical Question: In ACL rupture patients, does the Bridge-Enhanced ACL repair improve functional outcomes (strength, psychological readiness, subjective patient scores, and successful return to play) in comparison to the traditional ACL autograft repair?

Summary of Findings: The BEAR procedure was shown to have higher ACL-RSI scores at 6 months and higher KOOS self-reported symptoms at 1 year post-operative. They also found that return to function was found to higher in the BEAR in comparison to the ACL reconstruction.

Clinical Bottom Line: The BEAR procedure was shown to be more effective in terms of psychological readiness of the athlete, along with an earlier resolution of symptoms. This leads to more successful rehabilitations for the ACL reconstructions. Overall, it was shown to be non-inferior to the traditional ACL reconstruction and is deemed a viable option for future patients.

Strength of Recommendation: Consistent Center for Evidence-Based Medicine Scale level 2 findings and being high-quality randomized control trials support the BEAR as a viable alternative in enhancing psychological readiness and facilitating earlier symptom resolution.

Keywords: Bridge-Enhanced ACL Repair, functional outcomes, Anterior cruciate ligament

Title: Evaluating AI-Generated Patient Information on GLP-1 Receptor Agonists: A Comparative Analysis of ChatGPT and Gemini

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Abstract

Introduction: Patients increasingly use online search engines and artificial intelligence (AI)–based tools to obtain medical information, particularly regarding widely prescribed therapies such as glucagon-like peptide-1 receptor agonists (GLP-1s) for diabetes and weight management. As AI-generated responses become integrated into platforms such as ChatGPT and Google-powered models, evaluating the quality, transparency, and readability of answers to frequently asked questions (FAQs) is critical.

Methods: The top 20 GLP-1–related FAQs and corresponding AI-generated responses were obtained from ChatGPT and Gemini. Questions were categorized using the Rothwell classification (Fact, Policy, Value). Transparency was assessed using the Journal of the American Medical Association (JAMA) benchmark criteria, informational quality using the Brief DISCERN score, and patient-centered communication using the Patient Education Materials Assessment Tool (PEMAT). Readability was evaluated using Flesch Reading Ease (FRE) and Flesch–Kincaid Grade Level (FKGL).

Results: Fact-based questions predominated for both ChatGPT (50.0%) and Gemini (60.0%). ChatGPT demonstrated higher transparency and informational quality, with a mean JAMA score of 2.90 (SD 0.91) versus 1.10 (SD 1.74) for Gemini, and higher mean DISCERN scores (26.4 vs 15.0). Thirty percent of ChatGPT responses met criteria for good transparency (JAMA >3), compared with 20.0% of Gemini responses. PEMAT actionability was poor for both models (mean 5.0%). Readability exceeded recommended levels, with mean FKGL near grade 12 for both models; Gemini policy responses were particularly difficult to read (mean FRE 20.0).

Conclusion: AI-generated FAQs addressing GLP-1 therapy for diabetes and weight loss show variable quality and transparency, with limited actionability and suboptimal readability. These findings support cautious use of AI-generated health information and highlight opportunities to improve patient-centered communication.

Keywords: Diabetes, artificial intelligence, readability

Title: The Digital Doctor Search: How ChatGPT and Google Gemini Respond to Patient Questions About Hyperthyroidism and Hypothyroidism

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Abstract

Introduction/Objectives: Thyroid disease affects approximately 20 million individuals in the United States and is associated with a broad range of physical and psychological symptoms that can negatively impact quality of life. Many thyroid-related symptoms are nonspecific and overlap with other medical conditions, which frequently leads patients to seek health information outside of clinical encounters, particularly through online sources. In recent years, generative artificial intelligence (AI) tools such as ChatGPT and Google Gemini have emerged as alternative resources for medical information. Despite their increasing use, the accuracy, transparency, readability, and patient-centeredness of AI-generated information related to thyroid disease remain poorly characterized.

Methods: This cross-sectional study evaluated responses to the top 20 frequently asked questions (FAQs) about thyroid disease generated by two publicly available large language models: ChatGPT (GPT-5; OpenAI) and Google Gemini (Gemini 2.5; Google). Data were collected on a single prespecified date using standardized prompts and fresh browser sessions to minimize personalization bias. Each model generated 20 FAQs with corresponding answers and cited URLs. Questions were categorized using Rothwell's Classification System, and referenced websites were classified by source type. Transparency was assessed using JAMA benchmarks, informational quality using DISCERN, patient-centeredness using the Patient Education Materials Assessment Tool (PEMAT), and readability using Flesch Reading Ease (FRE) and Flesch–Kincaid Grade Level (FKGL). Data extraction was performed independently and in duplicate.

Results: A total of 40 thyroid-related FAQs were analyzed. Most questions were factual, with technical details representing the most common subtype across both models. No significant differences were observed in the question category distribution between ChatGPT and Gemini. Transparency was limited for both platforms, as no responses achieved high JAMA benchmark scores and key elements such as authorship, attribution, and currency were frequently absent. Informational quality was moderate and variable, with DISCERN scores generally in the low-to-mid 20s and inconsistent discussion of risks, benefits, and quality-of-life considerations. Patient-centeredness assessments demonstrated higher understandability than actionability, with actionability remaining low across both models. Readability analyses showed that responses exceeded recommended patient education levels, with mean FKGL scores above the high school level. Government-affiliated websites demonstrated higher transparency scores than medical practice websites, though informational quality did not differ significantly by source type.

Conclusion: AI-generated responses to thyroid-related FAQs provide an accessible introduction to health information but demonstrate important limitations in transparency, completeness, actionability, and readability. While these tools may support early patient education, they are not appropriate substitutes for professional medical guidance. Continued evaluation and clinician oversight are essential as generative AI becomes increasingly integrated into patient information-seeking behaviors.

Title: Exploring Ciliogenesis Regulation

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Abstract

Cilia are important signaling organelles used by most cells in our bodies. There is evidence of a control mechanism that regulates the size of these organelles, but the proteins involved in this control mechanism are not well known. Genes that encode structural proteins of cilia are highly conserved across species making the study of ciliogenesis in the model organism *Chlamydomonas reinhardtii* transferable across more complex organisms. Within the *C. reinhardtii* genome there is a *lf4* gene that encodes for a MAP kinase. Cells with a null mutation in this gene have cilia 3x longer than wild type. We hypothesize that a dual specificity protein phosphatase regulates LF4 kinase activity and/or ciliogenesis. We also propose that the expression of this protein phosphatase might be aberrant in *lf4* null mutants. Here we present the identification of 27 DSPs in *C. reinhardtii* and preliminary characterization of phosphatase-domains.

Keywords: Ciliogenesis, Phosphatases, Ciliopathies

Title: **Eye care in the Emergency Department: An equity assessment of the NHAMCS, 2019-2022**

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Abstract

Introduction/Objectives: In U.S. Emergency Departments (ED), visits for ocular injuries, corneal abrasions, and posterior vitreous detachments, conjunctivitis, amongst others, are seen; however, many of these diagnoses can be treated in outpatient settings. Our objective was to examine the rates of eye-related ED visits using data from the National Hospital and Ambulatory Care Survey (NHAMCS; 2019-2022) and assess associations of eye diagnosis type by triage level, geographic location, and patient sociodemographics.

Methods: Using NHAMCS, a national survey conducted annually by the National Center for Health Statistics, we performed a cross-sectional analysis on the utilization of emergency departments for eye-related injuries. We assessed prevalences and performed X^2 tests to examine associations with various sociodemographic variables and the types of injuries seen.

Results: A total of 1,079 ED visits were eye-related—1.6% overall—representing over 2.2 million visits annually. Of these visits, a majority were for eye disease/adnexa, (74.6%), while eye injuries, including burns, corrosions, and foreign bodies, comprised 17.9%. Diagnosis type was significantly associated with triage level, age, sex, and payment type ($P<.01$). Males accounted for 62.9% of eye injuries, while females had higher rates of eye disease and complications with artificial eyes. Medicaid was the payment source for 40.4% of all eye-related visits, and 46.6% of eye-disease visits. Hospital location and race were not significantly associated with diagnosis type.

Conclusions: As a majority of ED visits were for eye diseases—which can be avoided by regular management and regular visits to primary eye care providers, our findings suggest these ED visits may add unnecessary strain on the emergency healthcare system. As Medicaid was most often the payment type for these visits, improved health policies that increase access to primary and preventive care may reduce the likelihood of these individuals to seek eye care in the ED.

Keywords: Emergency Eye care, Ocular injuries in the Emergency Department, Eye care access, NHAMCS

Title: **Takotsubo Cardiomyopathy: Mid-Ventricular Cardiomyopathy Mimicking ST- Elevation Myocardial Infarction**

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Abstract

Introduction: Takotsubo cardiomyopathy is characterized by regional systolic dysfunction of the ventricular wall– most commonly the left ventricle. Takotsubo mimics myocardial infarction (MI) in patient presentation, but occurs without obstructive coronary disease. Takotsubo is thought to be induced by physical or emotional stressors. The pathophysiology is thought to be due to catecholamine excess resulting in myocardial toxicity and coronary vasospasm. The "typical" presentation occurs when there is systolic dysfunction of the apical portion of the left ventricle resulting in apical ballooning. The other four presentations include the mid-ventricular, basal, focal, and global variants. The mid-ventricular variant results when there is akinesia of the mid-ventricular portion of the left ventricle and hyperkinesis of the apex resulting in 14.6% of cases. The distinction between MI and Takotsubo cardiomyopathy remains important as patients may present with similar symptoms with vast differences in pathophysiology and management.

Case Presentation: Our patient was a 40-year-old female with a history of nicotine dependence, obesity, prediabetes, and depression who presented to the emergency room with chest pain. Upon arrival, the patient reported an episode of chest pain which radiated to her bilateral extremities with associated shortness of breath, nausea, and vomiting. The patient had reported significant stress at this time due to her mother suffering from dementia. Electrocardiogram (ECG) was performed which showed normal sinus rhythm without ST elevations or depressions. Biomarkers were ordered with an initial troponin of 1.79 ng/mL.

Overnight, the patient reported an acute worsening of her chest pain with an elevated heart rate in the 130's. Nitroglycerin administration resulted in improvement of her chest pain. Repeat ECG revealed sinus tachycardia with new ST elevations in aVL and reciprocal depressions in leads II, III. Secondary troponin had increased to 6.33 ng/mL. These findings raised suspicion for lateral ischemia and cardiology was consulted for evaluation with left heart catheterization.

Left heart catheterization revealed minimal coronary artery disease but noted a reduced ejection fraction of 20%. Ventriculogram performed during LHC showed hyperkinesis at the apex, akinetic in the middle segment, and hypokinetic in the anterobasal segments of the left ventricle, representative of a mid-ventricular Takotsubo variant.

As there was no evidence of coronary occlusion, vascular interventions were not indicated and the patient was transferred to the general floor for medical management.

Goal directed medical therapy (GDMT) was initiated and the patient was started on lasix for volume overload. She remained stable and was able to discharge on aspirin, high-intensity statin, Lisinopril, and

Toprol with instructions to monitor her blood pressure daily. Follow-up with cardiology was scheduled for close monitoring and for uptitration of GDMT outpatient.

Discussion: In this study, our patient presented to the ER with the chief complaint of chest pain and elevated troponin I with normal ECG findings. The patient experienced an acute worsening of symptoms with new ST elevations and reciprocal depressions concerning for ST-elevated MI. Left heart catheterization with ventriculogram was revealing of nonobstructive CAD and new wall motion abnormalities of the left ventricle representing a mid-ventricular variant of Takotsubo cardiomyopathy. Differentiating between MI and nonischemic cardiomyopathy is crucial in guiding management as TS is reversible but may be accompanied by other complications, such as heart failure in our patient.

Conclusion: Our findings coincide with the presentation of mid-ventricular Takotsubo and the pathogenesis of stress-induced myocardial injury. This is important as symptomatic presentation may mimic STEMI, prompting left heart catheterization to rule out obstructive pathologies. Visualization of this abnormality with ventriculography is imperative to characterize Takostubo Syndrome– and the associated variant.

Keywords: Takotsubo, nonischemic cardiomyopathy, mid-ventricular variant, STEMI

Title: Optimization of Post Operative Pain in Colorectal Cancer Resection

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Abstract

Introduction/Objectives: Colorectal cancer is a renowned top three leading cause of cancer diagnoses worldwide. Most diagnoses are attributed to environmental factors, as around 5% of cases are considered familial in nature. Environmental factors are largely related to diet, including excessive ingestion of red meat, processed meats, and alcohol. Nine in ten colon cancer patients are greater than 50 years of age, however the incidence of patients diagnosed with colon cancer under the age of 50 is on the rise. This has led to a surge in research on colorectal cancer treatment over the last decade, however the morbidities associated with these treatment regimens are just as prevalent.

Methods: For our primary objective, articles were searched to identify the current treatment modalities for colorectal cancer. For our secondary objective, articles were searched to determine differences in morbidity and mortality of these treatment options.

Results: Chemotherapy is used as adjuvant or neoadjuvant therapy, while surgery is the mainstay treatment option for resectable tumors. It has been shown that laparoscopic surgery decreases undesirable short term outcomes following resection. Surgeons can operate on tumors via an open or laparoscopic approach with no difference in morbidity, mortality, or recurrence, although laparoscopic approaches are associated with lower estimated blood loss, higher rates of sphincter preservation, and shorter length of stay. It has also been reported that patients undergoing laparoscopic surgery report significantly less pain within the first 24 hours following surgery than those undergoing open colonic surgery, although it has been suggested that postoperative pain is directly correlated with the analgesic technique used, regardless of the surgical procedure. Keeping post-operative pain levels low is important, especially in an elderly population. At least 1 in 5 cancer patients may be at risk of opioid-use disorder, necessitating the need for adequate pain control in colorectal cancer patients.

Conclusions: Surgery is the mainstay treatment option for resectable colon cancer. A laparoscopic versus open approach is preferred due to the higher rates of sphincter preservation, lower estimated blood loss, shorter lengths of stay, and less post-operative pain. Keeping post-operative pain levels low is important especially in an elderly population. At least 1 in 5 cancer patients may be at risk of opioid use disorder, necessitating the need for adequate pain control in colorectal cancer patients. However, more research is required to determine if lower post-operative pain can be attributed to the surgical approach or intraoperative analgesia technique.

Title: Effect of neuropeptide targeting drugs in combination with existing obesity medication to alter cytokine profiling underlying weight loss

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Abstract

Introduction: Obesity is a global health concern characterized by chronic low-grade inflammation that contributes to metabolic dysfunction and increases the risk of cardiometabolic disease. Although pharmacological treatments can promote weight loss, their effects on inflammatory pathways and their variability across biological sex remains incompletely understood.

Methods: Male and female mice were assigned to one of four treatment groups: vehicle (IP injections of saline and DMSO), high dose neuropeptide receptor targeting drug (IP injections at 3mg/kg once in the morning and once in the evening), high dose approved obesity medication or combined high dose both the combination. The treatment was administered for 10 days, and body weight was recorded over this period. Following the treatment period, peripheral tissues was collected and stored at -80C until biochemical analysis. Protein was extracted from peripheral tissues by sonication of 100-200 mg tissue in 2.4 mL RIPA buffer supplemented with protease inhibitors, followed by 3 centrifugation steps in which supernatant was collected. Levels of interleukin-6 (IL-6) and chemokine C-C motif chemokine ligand 2 (CCL2) were quantified using enzyme-linked immunosorbent assays (ELISAs) and normalized to total protein levels as determined by the BCA protein assay. These markers were selected due to their established roles in obesity-associated inflammation and metabolic dysregulation. Sex-specific analyses were conducted to assess potential differences in inflammatory responses to each treatment condition.

Results: The levels of IL-6 were not significantly affected by treatments in either males or females. In males, CCL2 levels increased in the neuropeptide receptor targeting group, but not in the other treatment groups. CCL2 levels in females were not affected by treatment.

Conclusions: These initial findings indicate that neuropeptide targeting in combination with existing obesity medications will cause greater weight loss and is accompanied by increased CCL2 in peripheral tissues.

Keywords: Obesity; neuropeptide; cytokines

Title: **Comparison of Changes in Outcome Reporting in Substance Use Disorder Trials**

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Purpose: In 2021, over 46 million Americans met criteria for a substance use disorder (SUD), marking a steep rise and an urgent public health crisis. With psychiatric comorbidities increasingly recognized, reliable research is essential. Accurate outcome reporting is crucial for advancing evidence-based care.

Design Methods: We performed a registry-based cross-sectional analysis of interventional SUD trials to assess outcome change disclosure. Using ClinicalTrials.gov, we compared original and most recent entries to identify modifications (additions, removals, reclassifications) and reviewed corresponding publications for disclosure or justification. Although observational, the study adhered to PRISMA 2020 guidelines for systematic search, screening, and data extraction. Extending beyond prior work on selective reporting, our approach evaluated both the occurrence and transparency of modifications, providing a broader view of reporting practices in SUD trials.

Results: All 47 trials (100%) modified at least one prespecified outcome. Most changes occurred after study completion, and over a quarter were made post-publication. None were disclosed in registries or publications. Common modifications included wording edits, timing adjustments, and redefinitions; less frequent were the addition or removal of outcomes.

Conclusion: Outcome modifications in SUD trials are widespread yet rarely transparent. Greater accountability from investigators and journals is needed to ensure reliable reporting and maintain trust in addiction research.

Grant Support: none

Title: VOMS Screening Effect on False-Positive Concussion Rates in Collegiate Athletes: A Critically Appraised Topic

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Abstract

Clinical Scenario: Recognizing and managing concussions has become more prevalent as research into concussions has evolved over the last several decades. The Vestibular Ocular Motor Screening (VOMS) is an evaluation tool that has come out of the research. However, VOMS is not without its faults and can result in false-positive tests.

Clinical Question: During baseline concussion testing in collegiate athletes, does utilization of VOMS result in high levels of false-positive concussion diagnoses?

Summary of Findings: A history of motion sickness and migraines can lead to higher false-positive rates but the VOMS itself is not creating false-positive rates. Statistical differences between athlete's baseline assessment and history of symptoms support these findings.

Clinical Bottom Line: VOMS is a reliable baseline concussion test. False positive rates are associated more often with prior medical history of motion sickness or migraines and should be documented accordingly.

Strength of Recommendation: A range of CEBM level 2-4 findings support the usage of VOMS in baseline concussion testing.

Keywords: Traumatic Brain Injury, symptom provocation, evaluation and diagnostics

Title: Effects of Caffeine Intake on 20 to 30-Year-Old Athletes Reaction Time Based on the Stroop Test: A Critically Appraised Topic

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Abstract

Background: Caffeine is the most commonly used ergogenic substance in the world. Athletes are frequently identified as a population with high utilization rates, but their use has been a topic of ongoing controversy, particularly in regards to the permissible limits set by athletics governing bodies to prevent unfair advantages in competition. There are many factors that help an athlete be successful in their sports, and some of these aspects can be overlooked. Reaction time is a large part of cognitive performance that is incorporated into sports. While caffeine has been found to improve different aspects of athletic performance, it could also have some effects on reaction time in team-sport athletes.

Focused Clinical Question: In team-sport athletes ranging from 20 to 30 years of age, does caffeine consumption have an effect on reaction time according to the Stroop Test?

Methods: A computerized search was conducted in October 2025 on PubMed, Embase, Scopus, and ScienceDirect. The search resulted in two articles that fit the specified inclusion and exclusion criteria. These articles were then evaluated to develop an answer for the focused clinical question.

Results: Patients were given a low to moderate (5mg/kg^{-1} to 6mg/kg^{-1}) dosage of caffeine prior to exercise protocols. The Stroop test was then utilized to measure their reaction time compared to a placebo sugar pill or solution. After the Stroop test results were evaluated, it was found that males had a small, insignificant decrease in reaction time performance on two of the three tests. The females did not have any remarkable findings in terms of reaction time.

Conclusion: There were no significant effects on reaction time from caffeine consumption in male or female team-sport athletes compared to a placebo. Athletic trainers can utilize this information to educate coaches and athletes on making decisions to implement caffeine into their pre-practice or pre-competition routine. It can also educate athletic trainers to get a better understanding of caffeine's effects on reaction time, so they can use this information when treating athletes in rehabilitation plans.

Strength of Recommendation: Based on the Oxford Center for Evidence-Based Medicine, the CEBM level of recommendations of these articles were 1b (Almeida RF, et al.) and 2 (Ali A, et al.).

Keywords: Caffeine, reaction time, team sport, athlete, placebo

Title: **Iron Stores After Hysterectomy: An Analysis of Postoperative Ferritin Levels**

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Abstract

Introduction/Objectives: Ferritin, measured as serum ferritin (sFT), functions as the principal iron storage protein and is widely used in clinical practice as a surrogate marker of total body iron reserves. Hysterectomies for premenopausal women under the age of 50 prematurely cease menstrual blood loss—a natural physiological depletion of iron stores, in addition to other hemodynamic shifts, though few studies have investigated sFT levels among either group. Thus, our objective was to analyze sFT levels between women who have and have not undergone hysterectomies and also stratify these analyses by age.

Methods: We conducted a cross-sectional study to assess the impact of hysterectomies on sFT levels, and by extension, rates of iron deficiency, using data from the National Health and Nutrition Examination Survey (NHANES) from the 2015-2023 data cycles. To assess differences, we used regression models and X^2 tests.

Results: From a sample of 1196 women aged 20-49, we found that sFT significantly differed among women with (113.5 ng/mL; SE: 12.3) and without (M = 53.0 ng/mL; SE = 1.4) a history of hysterectomy (P < .0001). The trend was similar for women under 40 years of age (*P* = .002) and those 40+ *P* = .003). The subgroup analysis for women 40+ indicated 36.4% of those without a history of hysterectomy were iron-deficient, compared to 6.4% of those who had; conversely, 24.9% of the latter group had high ferritin (>150 ng/mL) levels.

Conclusions: Our findings indicate that women with hysterectomies are more likely to develop hemochromatosis, whereas women without hysterectomies are more likely to develop iron deficiency anemia. Hemochromatosis may be asymptomatic or present with symptoms such as joint or abdominal pain, fatigue, diabetes, organ failure, skin hyperpigmentation, or cognitive changes. Iron deficiency, however, may be asymptomatic or present with fatigue, weakness, pallor, cardiopulmonary symptoms, neurologic complaints, brittle nails, restless legs, or pica. Together, these findings highlight the importance of routine iron monitoring, particularly given that standard laboratory panels do not typically include iron studies, emphasizing the need for regular assessment of iron levels in women.

Keywords: NHANES, Ferritin, Iron deficiency, hysterectomy, women's health

Title: Substance and Alcohol Use in Patients with Psychiatric Diagnoses in US Emergency Departments from 2019 to 2021 and Associated Recidivism

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Abstract

Introduction/Objectives: The use of emergency departments (ED) for substance use and other mental health concerns has increased substantially in recent decades. This increase is due, in part, to a growing disparity between the prevalence of mental health disorders and the lack of stable mental healthcare and addiction resources. This places EDs in a unique position to provide early identification and interventions for people with psychiatric disorders.

Methods: We conducted a cross-sectional analysis of American ED visits as reported by the 2019-2022 National Hospital Ambulatory Medical Care Survey (NHAMCS). Psychiatric diagnoses for ED visits were defined as having an ICD-10 “F code” assigned to the visit.

Results: Of 66,573 ED visits, 9.5% (n=7,466) had a psychiatric diagnosis reported for the visit. Patients with a psychiatric diagnosis were significantly more likely to have a history of AUD, SUD, or both (47.7%) compared to non-psychiatric visits (5.6%; $p < .0001$). Patients with psychiatric history in rural areas were significantly more likely to have no substance use history ($p = .008$) and less likely to have SUD ($p < .0001$), compared to urban patients. Patients with a history of AUD were significantly more likely to exhibit ED recidivism ($p = .022$).

Conclusions: Patients with a psychiatric diagnosis and AUD were significantly more likely to exhibit recidivism. These data support the use of standardized assessment tools for people with mental illness, and for providing support and referral to alcohol and substance use treatment to prevent ED utilization and recidivism.

Keywords: Substance Use Disorder; Alcohol Use Disorder; Recidivism; Emergency Department; Psychiatric Disorders; Mental Health

Title: **Accidental Camphor Ingestion in a Patient with Seizure Disorder: A case report**

Authors: *A Vanzant; GD Smith; A Lane; K Murray*

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1. *Oklahoma State University Center for Health Sciences, Tulsa, OK (AV, GS, AL, KM)*

Abstract

Introduction/Objectives: Camphor is a highly lipophilic bicyclic monoterpene ketone that acts through transient receptor potential channels 1/2 (TRPV1/TRPA2) and produces local pain relief by desensitizing sensory neurons. It is a known neurotoxin that can rapidly lead to seizures, lethargy, ataxia, severe nausea, vomiting, CNS depression, and mental status changes if ingestion meets the toxic dose. We present a case of accidental camphor overdose with associated camphor product concentrations in a patient with previous seizure disorder.

Case Report: A 53-year-old female (112.49 kg) presented to an urban emergency department (ED) by ambulance after accidental ingestion of an estimated 4 ounces of 6.2% camphor oil humidifier solution (6.2 grams of camphor per 100 mL). After initial examination and anxious, jittery symptoms were reported by the patient, 2 mg of lorazepam was given intravenously in an attempt to raise her seizure threshold. Due to the patient's history of seizures and the recommendation of the poison control center, the patient was admitted for observation and monitored for seizure activity.

Conclusion: No published literature currently addresses camphor toxicity in individuals with a preexisting seizure disorder. This mechanism of toxicity should be considered with patients who present with new onset seizures of unknown origin. This patient's treatment plan included monitoring and proactively preventing seizure activity by administering lorazepam after initial examination as well as home seizure medications, with follow up observation. Ultimately, this case illustrates a unique scenario of unintentional camphor overdose in a patient with a known seizure disorder and calls for emergency department physicians and healthcare providers to consider camphor overdose in patients who present with seizures after a presumed magnesium citrate ingestion.

Keywords: camphor, toxic, ingestion, emergency, seizure

Title: The Impact of Social Determinants of Health and the Age of Diabetes Onset: An Analysis of the Behavioral Risk Factor Surveillance System

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Introduction/Objectives: Type 2 diabetes remains a major contributor to morbidity and health care costs in the United States. Social determinants of health (SDOH) such as food insecurity, transportation barriers, and cost-related delays in care are known to worsen diabetes outcomes; however, their relationship with age at diabetes diagnosis is less well characterized. Earlier diagnosis may indicate accelerated disease development and longer lifetime exposure to complications. The primary objective of this study was to evaluate the association between individual and cumulative SDOH burden and age at type 2 diabetes diagnosis among U.S. adults. A secondary objective was to assess geographic variation in age at diagnosis associated with SDOH burden.

Methods: We conducted a cross-sectional analysis of the 2023 BRFSS adult sample to assess self-reported age at diabetes diagnosis among respondents diagnosed within the past two years. SDOH were assessed as individual domains (e.g., cost-related care delay, food insecurity, transportation barriers) and as a cumulative SDOH severity scale (none, mild, moderate, severe). Survey-weighted regression models adjusted for sociodemographics and access to care.

Results: Several domains were linked to earlier diagnosis after adjustment: cost-related care delay (–2.8 years; 95% CI –4.1 to –1.9), food insecurity (~ –3.3 years), difficulty paying bills (–4.7 years), and lack of reliable transportation (–3.0 years; all p≤0.002). Relative to no SDOH, moderate burden (2–5 domains) was associated with diagnosis 5.4 years earlier (P<0.001), and severe burden (≥6) with ~5.4 years earlier (P=0.014; unadjusted ≈12.9 years earlier). Geographic clustering showed younger diagnosis in high-burden states.

Conclusions: Cumulative SDOH burden is strongly associated with earlier diabetes diagnosis, amplifying lifetime complication exposure. Implication: Integrate standardized SDOH screening and ICD-10 Z-code documentation to risk-stratify earlier screening. Recommendation: Health systems and payers should support Z-code–driven care coordination and address food/transportation insecurity. Broader impact: Targeting SDOH may delay onset and reduce inequities.

Keywords: BRFSS, lifespan, chronic disease, social determinants of health. type 2 diabetes, age at diagnosis, health disparities, public health.

Title: Geriatric Workforce Shortages: Their Impact on Access, Quality, and Continuity of Care for Older Adults in the United States

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Abstract

Introduction/Objectives: A rapidly growing percentage of older adults in the United States is placing increasing demands on health systems already battered by persistent and ongoing workforce shortages. Even though leaders in the geriatric field and policymakers have issued warnings for decades regarding the eventual graying of the American population, the supply of clinicians trained to care for older adults remains vastly insufficient and unevenly distributed. These shortages include staff at all levels – geriatricians, physicians, nurses, and allied health professionals. This review examines how geriatric workforce shortages are affecting care access, provider continuity, and quality of care for older adults, and also examines disparities across geographic and care settings.

Methods: A narrative review of peer-reviewed literature was conducted. This focuses on geriatric workforce supply, distribution, and training, as well as reported impacts on healthcare delivery and patient outcomes. Sources included studies and policy analyses addressing physician and advanced practice provider shortages, statistics showing national, as well as by state and school, residency and fellowship match rates from the national match service, interdisciplinary geriatric care models, and workforce trends in both metropolitan and nonmetropolitan settings. Findings were analyzed thematically to identify recurring patterns and system-level consequences.

Results: Workforce shortages across numerous studies were consistently associated with delayed access to care, increased provider turnover, a lack of provider continuity, and greater reliance on non-specialist clinicians. Alarmingly low match rates to geriatrician residency and fellowship programs nationwide were found. The most affected areas were rural and nonmetropolitan. Increased hospitalizations and lower satisfaction rates among patients and caregivers were just two results of these shortages, with stress on long-term services and supports being others. Many counties lacked any geriatric-trained providers. While the evidence suggests that nurse practitioners and team-based care models can partially alleviate shortages, problems remain in complex care coordination and comprehensive geriatric assessments. All of this has major impacts on states with large amounts of rural areas like Oklahoma.

Conclusions: Geriatric workforce shortages are a serious threat for the provision of high-quality care for older adults. These shortages also disproportionately affect states which are more rural in character like Oklahoma. These shortages will require strategies that are complex and versatile, like talent and recruiting development expansion, improved reimbursement models, training across disciplines, and system-level redesign that embeds geriatric principles across care settings. With the aging population continuing to grow, improving geriatric capacity and training isn't merely optional, it's essential.

Keywords: geriatric workforce, workforce shortages, older adults, access to care, continuity of care.

Title: Improving Heparin Infusion Continuity During Interfacility Transfers: A Quality Improvement Initiative to Standardize Protocol Implementation

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Abstract

Introduction/Objectives: Unfractionated heparin infusions require frequent monitoring and dose adjustments, particularly during the initial hours of therapy when activated partial thromboplastin time or anti-factor Xa levels are checked approximately every 4 hours. This critical timing and titration can be disrupted during interfacility patient transfers, leading to gaps in anticoagulation monitoring and potential subtherapeutic or supratherapeutic levels. Heparin exhibits marked variability in anticoagulant response among patients due to nonspecific binding to plasma proteins and endothelial surfaces, making standardized protocols essential for safe transitions of care. The objective of this quality improvement project was to implement and evaluate an educational intervention focused on a standardized protocol for continuing heparin infusions in patients transferred from outlying facilities, thereby improving anticoagulation safety and reducing workflow burden on nursing and pharmacy staff.

Methods: This quality improvement initiative was conducted at OSU medical center between October 8, 2025 and November 18, 2025. The intervention consisted of developing a standardized protocol for heparin infusion management in transferred patients and implementing a structured educational program targeting resident physicians. The protocol addressed initial assessment of heparin therapy from the transferring facility, timing of laboratory monitoring upon arrival, and standardized dose adjustment criteria. Educational interventions included didactic sessions, case-based discussions, and distribution of protocol materials. To assess the effectiveness of the educational intervention, we administered knowledge assessment quizzes to resident physicians before and after the educational session. The quizzes evaluated understanding of the new protocol, including nursing instructions, standardization of coagulation parameters, and heparin order sets. Pre- and post-intervention quiz scores were compared to measure improvement in protocol knowledge and comprehension.

Results: Following implementation of the educational intervention, resident physicians demonstrated significant improvement in understanding of the standardized heparin transfer protocol. Pre-intervention quiz scores revealed gaps in knowledge regarding appropriate timing of laboratory monitoring and dose adjustment criteria for transferred patients on heparin infusions. Post-intervention assessment showed marked improvement in protocol comprehension, with residents demonstrating enhanced understanding of how to order continued heparin infusion, relay this information to staff, and standard protocol for heparin continuation. The standardized protocol was well-received by nursing and pharmacy staff, who reported improved clarity in managing heparin infusions for transferred patients and reduced uncertainty in clinical decision-making.

Conclusions: Implementation of a standardized protocol for heparin infusion management in transferred patients, coupled with targeted resident education, successfully improved knowledge and understanding of appropriate anticoagulation practices during interfacility transitions of care. This quality improvement initiative demonstrates that structured educational interventions can effectively enhance protocol adoption and reduce workflow complexity for multidisciplinary staff managing anticoagulated patients during transfers. The success of this initiative suggests that similar standardized approaches may benefit other institutions receiving patients on heparin infusions from outlying facilities, potentially improving patient safety and care coordination during critical transitions.

Title: Use of High Throughput mRNA analysis to Detect Changes in Protein Expression Following 10-week PFOA exposure.

Authors: *DR. Wallace; H Hamdan; S Rashid*

Affiliations:

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Abstract

Introduction/Objectives: Perfluorooctanoic acid (PFOA) is a persistent environmental contaminant increasingly linked to metabolic dysregulation, immune perturbation, and elevated cancer risk. High-resolution transcriptomic profiling using the nCounter® platform provides a powerful approach to elucidate pathways underlying toxicant-induced cellular reprogramming. In this study, we employ transcriptomic profiling with the Metabolic Pathway and Autoimmune Panels to characterize transcriptional alterations in pancreatic cells following 10 weeks of PFOA exposure. This approach is designed to define coordinated changes in metabolic networks and immune-related signaling that may contribute to mitochondrial dysfunction, chronic inflammation, and pro-tumorigenic phenotypes. By integrating targeted transcriptomic profiling with chronic exposure paradigms, this work aims to identify key molecular signatures and candidate biomarkers of PFOA-induced pancreatic toxicity.

Methods: Cells were obtained from ATCC [Control: hTERT-HPNE (CRL-4023™) and three cancer cell lines—AsPC-1 (CRL-1682™), PANC-1 (CRL-1469™), and MiaPaCa-2 (CRL-1420™)] and maintained according to ATCC guidelines and mRNA was extracted using the Qiagen RNeasy Mini Kit. RNA was quantified and integrity assessed, and samples were shipped to the Bruker customer service laboratory using custom biomarker panels. Data was supplied as *.RCC files were analyzed using nSolver™ v4.0 with standard three-step normalization: 1) positive control spike-in correction, 2) housekeeping gene normalization (GAPDH, ACTB, RPL19), and 3) background subtraction. Differential expression and pathway enrichment were assessed using NanoString Advanced Analysis (R package), with FC≥ 2 and $p < 0.05$ (Benjamini–Hochberg) considered significant.

Results: There were 4 core findings: **1) Time-Dependent Effects Are Stronger Than Cell-Line Differences**. Exposure duration is the dominant driver of transcriptional change: 1 week induces acute immune stress responses with mixed activation and suppression, and 10 weeks produces large-magnitude, consolidated transcriptional reprogramming indicative of chronic adaptation. **2) 1-Week exposure results in an acute immune disruption with interferon bias**, characterized by immune perturbation rather than uniform activation featuring suppression of cytokine/chemokine signaling, downregulation of immune co-stimulatory and checkpoint-related genes, and induction of interferon-stimulated genes. **3) 10-Week exposure results in durable immune reprogramming**, characterized by a stable, immune-altered state with reduced immune-recognition capacity, enhanced innate and inflammatory stress signaling, and immune tolerance/evasion, or inflammatory persistence. **4) Cancer cells exhibit amplified and more persistent effects**. Tumor cells display greater FC, persistent suppression of antigen presentation and immune checkpoints, and stronger engagement of inflammasome- and interferon-related pathways.

Conclusions: We conclude that PFOA exposure induces a consistent, time-dependent shift from early immune disruption to chronic innate immune reprogramming, supported by 1) Early suppression of cytokine and immune activation pathways, 2) Progressive loss of antigen presentation and immune regulation, and 3) Sustained interferon and inflammatory stress signaling. This suggests that malignant cells may be more susceptible to, or better able to exploit, PFOA-driven immune reprogramming. We hypothesize that PFOA acts as a chronic immune-modulating environmental stressor, with potential implications for pancreatic inflammation, immune surveillance failure, and tumor persistence, particularly under long-term exposure conditions.

Title: RNA Expression and Proteomic Profile for Key Function Proteins in Pancreatic Cancer

Authors: *DR Wallace; S Rashid; H Hamdan*

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Abstract

Introduction/Objectives: Dysregulation of signaling networks governing cellular metabolism, survival, differentiation, and immune modulation is a hallmark of cancer progression and therapeutic resistance. Key nodes within these networks include transcription factors (FOXO1, FOXO3, GATA4, GATA6), kinases and scaffolding proteins in the PI3K–Akt–mTOR axis (Akt, mTOR, RICTOR, RAPTOR, PTEN), regulators of mitochondrial quality control and longevity pathways (SIRT1, PINK1, PARKIN), extracellular matrix remodeling enzymes (MMP2, MMP9), and immune-metabolic enzymes involved in tryptophan catabolism (IDO1, IDO2). The objective of this study was to leverage the OncoDB cancer genomics and proteomics database to systematically characterize RNA expression and proteomic profiles of these targets across human malignancies, with the goal of identifying coordinated expression patterns, pathway-level dysregulation, and clinically relevant molecular signatures.

Methods: Publicly available RNA sequencing and proteomic datasets were queried using the OncoDB platform, encompassing multiple solid tumor and hematologic cancer types with matched normal tissue when available. Gene-level RNA expression (normalized counts or transcripts per million) and corresponding protein abundance data were extracted for FOXO1, FOXO3, GATA4, GATA6, mTOR, RICTOR, RAPTOR, Akt, PTEN, SIRT1, PINK1, PARKIN, MMP2, MMP9, IDO1, and IDO2. Comparative analyses were performed between tumor and normal tissues, and across tumor subtypes, to assess differential expression trends. Correlation analyses were used to evaluate concordance between transcriptomic and proteomic profiles and to identify co-expression modules suggestive of shared regulatory control. Where available, associations with clinical parameters, including tumor grade and patient survival, were explored using OncoDB-integrated metadata.

Results: OncoDB analysis revealed consistent dysregulation of the PI3K–Akt–mTOR signaling components across multiple cancer types, characterized by elevated RNA and protein expression of Akt, mTOR, RAPTOR, and RICTOR, coupled with reduced or variable PTEN expression. FOXO1 and FOXO3 frequently exhibited decreased transcript and protein levels in tumors relative to normal tissues, consistent with suppression of tumor-suppressive transcriptional programs. In contrast, GATA4 and GATA6 displayed cancer-type–specific expression patterns, with notable upregulation in select gastrointestinal and pancreatic malignancies. Mitochondrial quality control regulators PINK1 and PARKIN showed altered expression profiles suggestive of disrupted mitophagy, while SIRT1 expression was broadly increased at the RNA level, with more heterogeneous protein-level changes. MMP2 and MMP9 were robustly overexpressed in advanced and invasive tumors, aligning with roles in extracellular matrix remodeling. IDO1, and to a lesser extent IDO2, demonstrated elevated expression in several tumor types, correlating with immune-modulatory signatures. Overall, moderate to strong concordance between RNA and protein expression was observed for several targets, although notable discordance highlighted post-transcriptional regulation.

Conclusions: This integrative OncoDB-based analysis identifies coordinated alterations in transcriptional, metabolic, mitochondrial, extracellular matrix, and immune-metabolic pathways across human cancers. The combined RNA and proteomic profiling of these targets underscores pathway-level vulnerabilities and highlights candidate biomarkers and therapeutic nodes relevant to tumor progression and immune evasion. These findings provide a systems-level framework for prioritizing mechanistic and translational studies focused on metabolic regulation, mitophagy, and tumor–immune interactions in cancer.

Keywords: mitophagy, apoptosis, mitochondria

Title: Exposure to Chemicals from Native American Plants Impact Cell Function in Normal and Cancerous Colorectal Cells

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Abstract

Introduction/Objectives: Colorectal cancer (CRC) is a leading cause of cancer-related morbidity and mortality in the US. In parallel, interest has grown in the biological activities of plant-derived compounds traditionally used in Native American (NA) medicinal practices, which contain bioactive molecules capable of modulating oxidative stress, inflammation, mitochondrial function, and cell signaling pathways that are central to colorectal carcinogenesis. Berberine, sulforaphane, curcumin, hydrastine (isolated from goldenseal) and goldenseal (Hydrastis canadensis) root extract represent common naturally occurring compounds with anticancer properties, but their effects across normal and cancerous colorectal cells remain incompletely defined. Our work will begin to clarify whether traditional NA plant constituents offer benefits against CRC while maintaining normal cell integrity, thereby contributing to improved, culturally informed therapeutic development.

Methods: We maintained and utilized two commercially available CRC lines, CCD-18Co (normal; ATCC® CRL-1459™) and HT-29 (tumor; ATCC® HTB-38™). CRC cells were seeded into 96-well plates at a concentration of 1×10^5 cells/mL 24h before exposure. We used 0-100 µM and 20 µM, or 1-100µM and 20µg/well for exposure concentrations. After exposure, cells are incubated for 48h at 37°C in a humidified atmosphere of 5% CO2. Assays to measure metabolically active cells, apoptotic activity, and mitochondrial health were performed using MTT, Apo-One™, and JC-10 kits, respectively. Data were analyzed using GraphPad PRISM (v11.0.0) by either two-way ANOVA (Tukey's post-hoc analysis) or one-way ANOVA (Dunnett's post-hoc comparison). All assays were performed as an N=4 in duplicate with an α=0.05 significance level.

Results: Our extraction method provided approximately 10% yield (1 g of crude extract from 10 g of root). In CCD-18Co normal cells, exposure to the plant products resulted in significant reductions in viable cells correlating with both concentration ($p=0.0092$) and treatment ($p=0.0002$). In HT-29 cancer cells, only concentration had a significant effect of concentration ($p=0.0015$). Exposure to 20µM or 20 µg of plant product for 48h resulted in significant reductions in caspase activity in both CCD-18Co ($p<0.0001$) and HT-29 cells ($p<0.0001$). The impact on mitochondrial health was greater in tumor cells ($p<0.0001$) compared to normal cells ($p<0.0001$). Using the OncoDB database, we found that RNA levels of 2 key mitophagy proteins, PINK1 and PARKIN, were under-expressed in CRC. With their expression being positively correlated. Both proteins are crucial mediators in the ubiquitin-dependent pathway.

Conclusions: The rank potency for each compound was berberine > goldenseal extract > sulforaphane >> curcumin>>hydrastine. In all assays, tumor (HT-29) cells were more sensitive to the effects of the natural products. In control cells, there was a clear separation of activity, with

only the higher concentrations exhibiting detrimental effects. Our data suggest that exposure to these natural products reduces the ability of tumor cells to repair and mitochondrial health, leading to the death of the tumor cells. These properties support their anti-tumor activity. Further investigation into the RNA expression/correlation of the ubiquitin-dependent and ubiquitin-independent pathways, using these plant-derived compounds, especially berberine and sulforaphane, may be a viable option for anti-cancer effects.

Title: Single-cell Sequencing Identifies Genomic Changes in Pancreatic Cancer Following 10-week PFO Exposure

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Abstract

Introduction/Objectives: Perfluorooctanoic acid (PFOA) is a widely distributed per- and polyfluoroalkyl substance (PFAS) that persists in the environment and bioaccumulates in human tissues. Chronic PFOA exposure has been linked to metabolic dysfunction, immune disruption, and increased cancer risk; however, its potential role in pancreatic tumorigenesis remains insufficiently characterized. Yet, conventional bulk sequencing methods obscure the contributions of rare or emerging cellular subpopulations that drive tumor progression. Single-cell sequencing can powerfully resolve cellular diversity, identify lineage trajectories, and detect subtle or low-frequency genomic alterations. Applying this technology to toxicant-exposed cancer models enables a mechanistic understanding of how environmental chemicals influence clonal dynamics, stress signaling, and tumor evolution. These analyses will define how chronic PFAS exposure can reshape the genomic landscape of pancreatic cancer and reveal early indicators of aggressive phenotypes or therapy resistance.

Methods: All cells were from the American Type Culture Collection. Control: hTERT-HPNE (ATCC® CRL-4023™) and two cancer cell lines—AsPC-1 (ATCC® CRL-1682™) and PANC-1 (ATCC® CRL-1469™). All cell lines are cultured and maintained according to ATCC guidelines and grown using defined growth media (control) or supplemented with 100 µM PFOA. Cells were maintained according to protocol for 10-weeks. Cells were suspended under RNase-free conditions by enzymatic dissociation and filtration. Viability (≥80%) was confirmed by trypan blue exclusion. Cell suspensions were fixed using the manufacturer's formaldehyde-based fixation and quenching protocol and the fixed samples sent out for split-pool combinatorial barcoding and library preparation. Data was analyzed using R using Seurat v5, (log normalization, PCA, and UMAP clustering). Cell type identification will use canonical pancreatic markers, and batch correction will be performed with Harmony. Differential expression is assessed using Wilcoxon rank-sum testing (FDR < 0.05).

Results: Differential gene expression analysis revealed distinct PFOA-responsive transcriptional programs across the three pancreatic cell models. In HPNE cells, PFOA exposure significantly altered genes associated with cellular stress responses, xenobiotic metabolism, and mitochondrial function. AsPC-1 cells exhibited robust changes in genes involved in cell survival signaling, autophagy, and inflammatory responses and upregulated pro-survival pathways were observed, consistent with enhanced tolerance. Several transcripts associated with immune modulation and cytokine signaling were also elevated, indicating crosstalk between PFOA exposure and tumor-associated inflammatory programs. PANC-1 cells demonstrated the most extensive transcriptional reprogramming following PFOA exposure. Differentially expressed genes were enriched for pathways involved in metabolic reprogramming, epithelial–mesenchymal transition (EMT), and DNA damage response. Genes regulating glycolysis, lipid metabolism, and mitochondrial dynamics were significantly altered, consistent with a shift toward a stress-adapted, aggressive cancer phenotype..

Conclusions: Comparative analysis across cell types demonstrated that normal HPNE cells exhibited a more constrained transcriptional response, primarily reflecting stress and mitochondrial dysfunction, whereas pancreatic cancer cells displayed broader adaptive and pro-tumorigenic transcriptional changes. These findings indicate differential susceptibility and adaptive capacity to PFOA exposure between normal pancreatic epithelium and malignant cells.

Title: How Reliable is AI for Sexual Health Information? A Cross-Sectional Study of ChatGPT and Google Gemini

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Abstract

Background: Sexually transmitted diseases (STDs) remain a major public health concern, and many individuals increasingly rely on online and artificial intelligence (AI)–generated information to address sensitive sexual health questions. Large language models (LLMs) such as ChatGPT and Google Gemini are widely accessible, yet their transparency, informational quality, readability, and patient-centeredness for STD-related content have not been well characterized. This study was performed to compare the quality, transparency, readability, and actionability of responses to frequently asked questions about STDs generated by ChatGPT and Google Gemini.

Methods: We conducted a cross-sectional evaluation of AI-generated responses to the top 20 STD-related FAQs produced by ChatGPT (GPT-5) and Google Gemini (Gemini 2.5), yielding 40 total question–answer pairs. FAQs were classified using Rothwell's system (fact, policy, value). Cited sources were categorized by website type. Transparency was assessed using the JAMA Benchmark Criteria, informational quality using the Brief DISCERN instrument, understandability and actionability using the Patient Education Materials Assessment Tool (PEMAT-P), and readability using Flesch–Kincaid Grade Level (FKGL) and Flesch Reading Ease (FRE). Data extraction was performed in duplicate, and analyses were descriptive with appropriate nonparametric comparisons.

Results: Most AI-generated FAQs were fact-based (ChatGPT 70%, Gemini 85%), with no value-based questions identified. ChatGPT more frequently cited academic sources, whereas Gemini predominantly referenced governmental websites. ChatGPT demonstrated higher transparency and informational quality, with greater adherence to JAMA criteria for disclosure (100% vs. 70%) and currency (80% vs. 40%), and higher DISCERN scores for source citation and currency. Gemini performed better on policy-oriented content, achieving higher DISCERN and PEMAT actionability scores for these questions. Overall understandability was high for both models, but actionability was low. Readability was suboptimal, with both models producing content at approximately a 10th–11th grade reading level.

Conclusions: ChatGPT and Google Gemini can provide generally accurate, fact-based STD information, but important differences exist in transparency, quality, and actionability. High reading levels, low actionability, and the absence of value-based or psychosocial content limit their utility as standalone patient education tools. LLMs may serve as useful adjuncts to sexual health education, but effective integration requires improved transparency, alignment with health literacy standards, and clinician oversight.

Keywords: sexually transmitted diseases; artificial intelligence; large language models; ChatGPT; Google Gemini; health information quality; readability; patient education

Title: Implications of Perceived Racial Discrimination on CAD Risk in African Americans

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Abstract

Background: African Americans face an increased risk of coronary artery disease (CAD) compared to Whites, which has been widely deduced to a genetic predisposition. With documented instances of perceived racial discrimination experienced by Blacks in the United States, a proven cause of chronic stress, the exploration of this underrepresented risk factor for CAD became a goal of this study. Our main objective was to observe the instances of racial discrimination experienced by the sample population from the 2022-2023 BRFSS survey, and to evaluate if the predisposition of Blacks to coronary artery disease could be linked to symptoms of chronic stress- a risk factor for CAD.

Methods: We conducted a cross-sectional analysis using the 2022-2023 data from the Behavioral Risk Factor Surveillance System (BRFSS). The sample population of this study included those who identified themselves as Black or African American and reported experiencing physical symptoms from racial discrimination. The SDOH observed were age, gender, education, income, health insurance coverage, and urban-rural residence. We used X^2 tests to assess associations between discrimination-induced symptoms and past history of MI and angina; it was also used when including the SDOH to provide a corrected odds ratio.

Results: The sample population for this study includes 20,472 people. In the preliminary results, black men over the age of 40 who have experienced physical symptoms from racial discrimination were 2.05 times more likely to report angina uncorrected for SDOH and 2.86x more likely when corrected for SDOH. Within the sample population, Black men under the age of 40 were 3.79x more likely to report myocardial infarction (MI) if they had experienced physical symptoms from racial discrimination compared to if they had not. Black women over the age of 40 were 1.89 times more likely to report angina if they selected 'yes' to experiencing physical symptoms due to racial discrimination when corrected for SDOH.

Conclusion: Racial discrimination has been shown to account for a significant increase in risk of certain CAD-related incidences, including MI and angina, in Black Americans who have endured physical manifestations of racial discrimination. Research directed at the effects of racism on MI-risk, specifically in Black men under the age of 40, is necessary in order to increase healthcare awareness of the danger posed to this population.

Keywords: Racial discrimination, coronary artery disease, social determinants, Black Americans

Title: **COVID-19 Exposure and Pediatric Brainstem Structure**

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Abstract

Background: The impact of the COVID-19 pandemic on child development is an evolving area of study. However, the effects of prior COVID-19 infection on brain structures critical for autonomic and behavioral functions remain understudied. This study aimed to assess structural differences in the brainstem, cerebellum, and associated regions among children with a reported history of COVID-19 infection compared to those without, using data from the Adolescent Brain and Cognitive Development (ABCD) Study.

Methods: We conducted a time-series analysis of magnetic resonance imaging (MRI) data from the ABCD study, a large-scale, longitudinal open-data neuroimaging cohort study that consists of approximately 12,000 children born between 2006 and 2008 at 21 sites across the United States. Regression analyses were used to compare volumetric growth in the brainstem, cerebellum, and related structures between pre-pandemic (2018-2019) and post-pandemic (2021-2022) scans. Cognitive performance at the 4-year follow-up was evaluated using the NIH Toolbox Cognition Battery.

Results: Of the 2,423 children in the sample, 195 reported a history of COVID-19 infection. This group exhibited significantly reduced volumes in the brainstem, cerebellum, hippocampus, amygdala, and accumbens area compared to those without prior infection. They also scored lower on the Picture Vocabulary, Flanker Inhibitory Control and Attention, and Oral Reading Recognition Tasks.

Conclusion: Previous COVID-19 infection was associated with reduced volumes in the brainstem and cerebellum, as well as lower cognitive performance in children. These findings suggest potential long-lasting implications for brain regions involved in autonomic regulation, motor coordination, and cognitive function. Further research is needed to assess the persistence of these changes and explore potential interventions.

Keywords: COVID-19, Pediatric Brain Development, Brainstem Volume, Cognitive Function

Title: Patient Perception of Osteopathic Manipulative Medicine at Oklahoma State University Medical Center.

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Abstract

Introduction: Osteopathic Manipulative Medicine is a hands-on approach used by Osteopathic physicians to diagnose, treat, and prevent illness or injury. This approach involves using the hands to move muscles, joints, and tissues with techniques such as stretching, gentle pressure, and resistance. In hospitalized patients, OMT can be particularly beneficial when integrated into conventional care. The rationale is that OMT supports healing by addressing musculoskeletal dysfunctions that may exacerbate or stem from medical conditions, immobility, or surgical procedures. This study focuses on how osteopathic medicine can promote healing in patients that are hospitalized.

Objective: The objective of this study is to determine how beneficial Osteopathic Manipulative Treatment is for hospitalized patients.

Methods: This study was conducted at Oklahoma State University Medical Center in Oklahoma. A survey was administered following two inpatient OMT treatment sessions. A medical student, not involved in the treatment team, obtained verbal consent from each patient. This study was conducted December 2025 and will include February 2026. Criteria for the study is as follows:

- ☐ Patient is ≥ 18 years old
- ☐ Received **at least 2 OMT sessions** during current hospital stay
- ☐ **NOT** currently in the ICU
- ☐ Able to speak and understand English
- ☐ No active delirium or cognitive impairment
- ☐ Able to verbally respond to survey questions
- ☐ Survey administered within **24 hours after second OMT treatment**

Demographic data was also collected from an electronic medical record database (EMR). The database used was EPIC, and that data includes: age, gender, race/ethnicity, insurance type, ICU admission during hospital stay, surgery during hospital stay, reason for OMT consult, and referring provider and service.

The survey is a Likert-scale questionnaire with answers being 1-10 (1 being not helpful at all and 10 being extremely helpful). Patients answered 10 questions about their experience with osteopathic manipulative treatment during their hospital stay.

Results: Results are preliminary with the study in progress. Patients noted moderate improvement in their pain, breathing quality/effort, and stress reduction. Most patients surveyed stated their bowel movements or digestive function were not significantly impacted by OMT. Additionally, most patients would recommend OMT as part of other patients' hospital stay. Many patients felt that OMT improved or resolved the issue that led to the osteopathic consult.

Conclusions: This study demonstrates a promising future for the impact of OMT on inpatient care. The following trends were noted:

- Moderate improvement in pain
- Moderate improvement in breathing quality/effort
- Moderate improvement in stress reduction
- Overall positive regard to receiving OMT during a hospital stay

There are a few limitations to the study. One would be the time constraint. Another would be the sample size, currently only 14 patients responded. To better assess the impact of OMT, more research is needed for more comprehensive data.

Keywords: Osteopathic Manipulative Medicine (OMT)

Title: A Novel Post-Translational Modification of HMGB1 in Oligodendrocytes is Modulated by Oxycodone Exposure

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Abstract

Introduction/Objectives: Opioid Use Disorder (OUD) often involving drugs like oxycodone, has created a major public health crisis with rising overdose deaths and strained healthcare systems. It remains one of the most urgent public health concerns in the United States, affecting many nationwide. Oxycodone has been notably shown to affect oligodendrocytes- myelin producing glial cells of the brain. Emerging evidence also suggests chronic oxycodone use has an impact on oligodendrocyte maturation and myelination. However, very little is known about how oxycodone influences oligodendrocyte post-translational modification, function, and interaction. In our study, we used Western Blot and Co-Immunoprecipitation to investigate post-translational modifications,specifically SUMOylation of HMGB1 (a damage-associated molecular pattern) released by oxycodone-treated oligodendrocytes.

Methods: In vitro cell culture model: Oli Neu-oligodendrocyte cell line Oli Neu cells were treated with different doses of oxycodone- 0 and 100 uM. Co-immunoprecipitation was conducted using previously used protocol- protein lysates were incubated with anti-HMGB1 antibodies to pull down HMGB1 and interacting proteins. Eluates were analyzed by Western Blot to detect SUMOylation and acetylation modifications associated with HMGB1. Western blot was conducted using previously used protocol- membranes were probed with mouse antibodies against HMGB1 and markers of SUMOylation. Bands were visualized using fluorescence and quantified to assess protein modification levels.

Results: Western blot images of OliNeu (cell line of oligodendrocytes) treated with doses of oxycodone show significant differences between control and treatment, as well as significant differences in nuclear and cytoplasmic fractions of OliNeu treated with doses of oxycodone on in the cytoplasmic fractions. Co-immunoprecipitation results of OliNeu treated with doses of oxycodone show the protein lysates were pulled down with HMGB1 antibody and probed with sumo2/3 antibody to assess the changes in the sumoylation of HMGB1.

Conclusions: Our results suggest that oligodendrocytes when treated with oxycodone releases HMGB1, an extracellular DAMP protein. HMGB1 expression is particularly higher in the cytoplasmic fraction suggesting its extracellular release. Our preliminary data from co-immunoprecipitation suggest possible alteration in the sumoylation levels. The experiments are ongoing to complete the replicates. We are also examining how oxycodone induced HMGB1 release is influenced by post-translational modifications such as acetylation and SUMOylation.

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