

OAKLAND UNIVERSITY WILLIAM BEAUMONT SCHOOL OF MEDICINE  
PUBLICATION LIST  
April - June 2022

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Abdelrahman AA, Powell FL, Jadeja RN, Jones MA, Thounaojam MC, Bartoli M, **Al-Shabrawey M** and Martin PM (2022). "Expression and activation of the ketone body receptor hcar2/gpr109a promotes preservation of retinal endothelial cell barrier function." Experimental Eye Research. ePub Ahead of Print.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Preservation of retinal barrier function is critical to maintenance of retinal health. Therefore, it is not surprising that loss of barrier integrity is a pathologic feature common to degenerative retinal diseases such as diabetic retinopathy. Our prior studies demonstrate the importance of hydroxycarboxylic acid receptor 2/GPR109A (HCAR2/GPR109A) expression in the retinal pigment epithelium (RPE) to outer retinal barrier integrity. However, whether HCAR2/GPR109A is expressed in retinal endothelial cells and has a similar relationship to inner blood retinal barrier regulation is not known. In the current study, we examined relevance of receptor expression to endothelial cell dependent-blood retinal barrier integrity. siRNA technology was used to modulate HCAR2/GPR109A expression in human retinal endothelial cells (HRECs). Cells were cultured in the presence or absence of VEGF, a pro-inflammatory stimulus, and/or various concentrations of the HCAR2/GPR109A-specific agonist beta-hydroxybutyrate (BHB). HCAR2/GPR109A expression was monitored by qPCR and electrical cell impedance sensing (ECIS) was used to evaluate barrier function. Complementary in vivo studies were conducted in wildtype and HCAR2/GPR109A knockout mice treated intraperitoneally with lipopolysaccharide and/or BHB. Vascular leakage was monitored using fluorescein angiography and Western blot analyses of albumin extravasation. Additionally, retinal function was evaluated by OptoMotry. Decreased (siRNA knockdown) or absent (gene knockout) HCAR2/GPR109A expression was associated with impaired barrier function both in vitro and in vivo. BHB treatment provided some protection, limiting disruptions in retinal barrier integrity and function; an effect that was

found to be receptor (HCAR2/GPR109A)-dependent. Collectively, the present studies support a key role for HCAR2/GPR109A in regulating blood-retinal barrier integrity and highlight the therapeutic potential of the receptor toward preventing and treating retinal diseases such as diabetic retinopathy in which compromised barrier function is paramount.

Abdu RW, **Long GW**, Baker D, Boudiab E, Callahan RE, Studzinski DM and **Brown OW** (2022). "Intramural hematoma of the thoracic aorta: A single-institution, 12-year experience." Journal of Vascular Surgery 75(6): 1872-+.

[Full Text](#)

*Department of Surgery*

Abplanalp LA, Ionescu F, Rojas OG, **Castillo E** and **Nair GB** (2022). "Differential impact of static lung compliance on need for reintubation in mechanically ventilated COVID-19 positive and negative patients." American Journal of Respiratory and Critical Care Medicine 205: A2932.

[Full Text](#)

*Department of Internal Medicine/Pulmonary & Critical Care Medicine*

*Department of Radiation Oncology*

Abramowitz D, Sam AP, Pachorek M, Ruel N, Martins F, Angulo J, Simhan J, Li E, Nikolavsky D, Policastro C, Ramirez-Perez E, **Burks F**, Shetty Z, Venkatesan K, Hunter C, Gallegos M, Foreman J, Pariser J, Kasabwala K, Lopez D, Macdonald S and Warner J (2022). "Multi-institutional review of non-hypospadiac penile urethral stricture management and outcomes." International Journal of Urology 29(5): 376-382.

[Full Text](#)

*Department of Urology*

Objectives: Penile urethral stricture disease not associated with hypospadias is rare, and there is a wide range of commonly used surgical repair techniques for this disease. We sought to compile a multi-institutional database of patients who had surgical correction of strictures in the penile urethra not limited to the meatus, and who had no history of hypospadias, for analysis using the Trauma and Urologic Reconstructive Network of Surgeons length, urethral segment and etiology classification system. Methods: A retrospective database from 13 institutions was compiled of patients who had undergone surgical correction of Trauma and Urologic Reconstructive Network of Surgeons length, urethral segment and etiology urethral stricture segments S2b/S2c and excluding E5, with a minimum follow-up time of 4 months. Failure was defined as cystoscopically confirmed recurrence of a stricture measuring less than 16-Fr. Results: We analyzed 222 patients with a median age of 57 years and a follow-up of 49 months. The overall surgical success rate was 80.2%. On multivariate analysis, the two variables identified that were predictive of surgical success were stricture length  $\leq 2$  cm as well as use of a buccal mucosa graft as compared to use of a fasciocutaneous flap, which had success rates of 83% and 52%, respectively ( $P = 0.0004$ ). No statistically significant differences were found based on incisional approach or surgical technique, nor were outcomes different based on etiology or preoperative patient demographics. Conclusions: Surgical repair of penile urethral strictures of non-hypospadiac origin have a favorable overall success rate, at 80.2%. Regardless of incisional approach or surgical technique, all operations appear to have similar outcomes other than repairs using fasciocutaneous flap, which were statistically less successful than those using buccal mucosa graft.

**Abushukur Y** and Knackstedt R (2022). "The impact of supplements on recovery after peripheral nerve injury: A review of the literature." Cureus 14(5): e25135.

[Full Text](#)

*OUWB Medical Student Author*

Agochukwu-Mmonu N, Qi J, Dunn RL, Montie J, Wittmann D, Miller D, Martin R, Kim T, **Johnston WK** and Peabody J (2022). "Re: Patient- and surgeon-level variation in patient-reported sexual function outcomes following radical prostatectomy over 2 years: Results from a statewide surgical improvement collaborative." Journal of Urology 207(4): 928-928.

[Full Text](#)

*Department of Urology*

Agochukwu-Mmonu N, Qi J, Dunn RL, Montie J, Wittmann D, Miller D, Martin R, Kim T, **Johnston WK** and Peabody J (2022). "Re: Changes in prostate-specific antigen testing relative to the revised us preventive services task force recommendation on prostate cancer screening." Journal of Urology 207(4): 928-929.

[Full Text](#)

*Department of Urology*

**Alakhras H, Yelton BR** and Beano H (2022). "First-time submassive pulmonary embolism likely caused by testosterone-enhancing supplement." Cureus Journal of Medical Science 14(5): e25103.

[Full Text](#)

*OUWB Medical Student Author*

**Alkhoury F**, Alkhoury S and Potts GA (2022). "Prurigo pigmentosa following a keto diet and bariatric surgery." Cureus 14(4): e24307.

[Full Text](#)

*OUWB Medical Student Author*

Allen O, Gallagher L and **Bloomingtondale R** (2022). "Pre and post-operative CT imaging of adult alcapa: Reverse left ventricular remodeling and regression of intracoronary collateral network." Journal of Cardiovascular Computed Tomography. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Almerico K, Salimnia T and **Dogra S** (2022). "Hex of the dex: Dexmedetomidine induced malignant hyperthermia in myotonic dystrophy." American Journal of Respiratory and Critical Care Medicine 205.

[Full Text](#)

*Department of Internal Medicine/Pulmonary & Critical Care Medicine*

Alslaim HS, Chan J, Saleem-Rasheed F, **Ibrahim Y**, Karabon P and **Novotny N** (2022). "Discordance among belief, practice, and the literature in infection prevention in the NICU." Children 9(4): 492.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Surgery*

This study evaluates practices of infection control in the NICU as compared with the available literature. We aimed to assess providers' awareness of their institutional policies, how strongly they believed in those policies, the correlation between institution size and policies adopted, years of experience and belief in a policy's efficacy, and methods employed in the existing literature. An IRB-approved survey was distributed to members of the AAP Neonatal Section. A systematic review of the literature provided the domains of the survey questions. Data was

analyzed as appropriate. A total of 364 providers responded. While larger NICUs were more likely to have policies, their providers are less likely to know them. When a policy is in place and it is known, providers believe in the effectiveness of that policy suggesting consensus or, at its worst, groupthink. Ultimately, practice across the US is non-uniform and policies are not always consistent with best available literature. The strength of available literature is adequate enough to provide grade B recommendations in many aspects of infection prevention. A more standardized approach to infection prevention in the NICU would be beneficial and is needed.

**Aoun M, Dekhou A, Jahshan A and Chinnaiyan K (2022).** "Gender, racial, and ethnic representation of cardiology fellows in the United States, 2014-2020: An underwhelming pace of diversification worsened by the COVID-19 pandemic." Journal of the National Medical Association. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Internal Medicine/Cardiovascular Disease*

Introduction: Cardiologists serve a diverse population of patients, yet the lack of diversity within the cardiology workforce has continued to persist and does not represent the composition of the patient population in the United States. Although medical schools and internal medicine residency programs have witnessed major improvements in diversity, the field of cardiology has not emulated these patterns. Methods: Gender, race, and ethnicity data from the graduate medical education supplements published annually in the Journal of the American Medical Association from 2014 through 2020 were analyzed. The effect of the COVID-19 pandemic on the recruitment of female trainees in cardiology was also investigated. Results and discussion: Women represented 24.6% of cardiology trainees in the year 2020, which is a minor increase from 21.2% in 2014. The percentage of Hispanic trainees has slightly decreased from 6.90% in 2014 to 6.26% in 2020, while the percentage of Black trainees has only increased from 5.45% in 2014 to 5.50% in 2020. The data demonstrate a clear disparity and a desperate need for diversification of the cardiology trainee workforce. The COVID-19 pandemic may also exacerbate this lack of diversity in upcoming years due to the reemergence of inequities in social responsibilities between male and female trainees. Implications: Strong action must be taken on an institutional level to shift the culture in cardiology to one that is more appealing to women and underrepresented minorities in order to better serve an increasingly diverse population.

Armstrong DG and **Grunberger G (2022).** "Stimulating results signal a new treatment option for people living with painful diabetic neuropathy." Journal of Diabetes Science and Technology. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine*

Background: Painful diabetic neuropathy (PDN) is a progressive condition that deprives many patients of quality of life. With limited treatment options available, successful pain management can be difficult to achieve. Methods: We reviewed results of recent data evaluating high frequency spinal cord stimulation (SCS). Results: from the SENZA-PDN randomized clinical trial (NCT03228420), the largest such trial to date, demonstrated 10-kHz spinal cord stimulation substantially reduced PDN refractory to conventional medical management along with improvements in health-related quality-of-life measures that were sustained over 12 months. These data supported the recent U.S. Food & Drug Administration (FDA) approval for 10-kHz SCS in PDN patients and contributed to the body of evidence on SCS available to health care professionals managing the effects of PDN. Conclusion: High frequency spinal cord stimulation appears to hold promise in treatment of painful diabetic neuropathy. We look forward to future

works in the literature that will further elucidate these promising findings.

**Attardi SM, Gould DJ, Pratt RL and Roach VA** (2022). "YouTube-based course orientation videos delivered prior to matriculation fail to alleviate medical student anxiety about anatomy." Anatomical Sciences Education. ePub Ahead of Print.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

**Bahado-Singh RO**, Radhakrishna U, Gordevičius J, Aydas B, **Yilmaz A**, Jafar F, **Imam K, Maddens M**, Challapalli K, Metpally RP, Berrettini WH, Crist RC, **Graham SF** and Vishweswaraiah S (2022). "Artificial intelligence and circulating cell-free DNA methylation profiling: Mechanism and detection of Alzheimer's Disease." Cells 11(11): 1744.

[Full Text](#)

*Department of Obstetrics and Gynecology*

*Department of Internal Medicine/Geriatric Medicine*

Background: Despite extensive efforts, significant gaps remain in our understanding of Alzheimer's disease (AD) pathophysiology. Novel approaches using circulating cell-free DNA (cfDNA) have the potential to revolutionize our understanding of neurodegenerative disorders. Methods: We performed DNA methylation profiling of cfDNA from AD patients and compared them to cognitively normal controls. Six Artificial Intelligence (AI) platforms were utilized for the diagnosis of AD while enrichment analysis was used to elucidate the pathogenesis of AD. Results: A total of 3684 CpGs were significantly (adj. p-value < 0.05) differentially methylated in AD versus controls. All six AI algorithms achieved high predictive accuracy (AUC = 0.949–0.998) in an independent test group. As an example, Deep Learning (DL) achieved an AUC (95% CI) = 0.99 (0.95–1.0), with 94.5% sensitivity and specificity. Conclusion: We describe numerous epigenetically altered genes which were previously reported to be differentially expressed in the brain of AD sufferers. Genes identified by AI to be the best predictors of AD were either known to be expressed in the brain or have been previously linked to AD. We highlight enrichment in the Calcium signaling pathway, Glutamatergic synapse, Hedgehog signaling pathway, Axon guidance and Olfactory transduction in AD sufferers. To the best of our knowledge, this is the first reported genome-wide DNA methylation study using cfDNA to detect AD.

Bax AM, Lin FY, van Rosendael AR, Ma X, Lu Y, van den Hoogen IJ, Gianni U, Tantawy SW, Andreini D, Budoff MJ, Cademartiri F, **Chinnaiyan K**, Choi JH, Conte E, de Araújo Gonçalves P, Gottlieb I, Hadamitzky M, Leipsic JA, Maffei E, Pontone G, Stone G, Shin S, Kim YJ, Lee BK, Chun EJ, Sung JM, Lee SE, Berman DS, Narula J, Chang HJ and Shaw LJ (2022). "Marked variation in atherosclerotic plaque progression between the major epicardial coronary arteries." European Heart Journal of Cardiovascular Imaging. ePub Ahead of Print.

[Request Form](#)

*Department of Internal Medicine/Cardiovascular Disease*

Aims: Atherosclerosis develops progressively and worsens over time, yet event risk patterns vary in the left circumflex (LCx), right coronary artery (RCA) and left anterior descending (LAD). The aim of this analysis was to examine varying progressive disease alterations between the three major coronary arteries. Methods and Results: Patients were included from a prospective, international registry of consecutive patients who underwent serial CCTA at a median interval of 3.3 years. Annual progression of quantitative total and compositional plaque volume were compared between the three coronary arteries (LCx, LAD, and RCA). Other analyses compared stenosis  $\geq 50\%$  and new high-risk plaque (HRP;  $\geq 2$  of the following: spotty calcification, positive

remodelling, napkin-ring sign, and low-attenuation plaque) on follow-up. Generalized estimating equations and marginal Cox regression models were used to compare progression, with covariate adjustment by the baseline atherosclerotic cardiovascular disease risk score, statin use, and plaque burden. Quantitative plaque measurements were calculated in 1344 patients (age  $60 \pm 9$  years, 57% men). Plaque progression occurred less often in the LCx (41.0%) as compared to the RCA (52.7%) and LAD (77.4%,  $P < 0.001$ ). Odds for annual plaque burden increase  $\geq$ population mean were 1.98- and 1.43-fold as high in the LAD ( $P < 0.001$ ) and RCA ( $P < 0.001$ ) as compared to the LCx. Similarly, the LAD was associated with a 2.45 higher risk of progression to obstructive CAD ( $P < 0.001$ ), as compared to the LCx; with no differences between the RCA and LCx ( $P = 0.13$ ). New HRP lesions formed least often in the LCx (3.4%), followed by the RCA (8.1%) and most often in the LAD (10.1%;  $P < 0.001$ ). Conclusions: Our findings reveal novel insights into varied patterns of atherosclerotic plaque progression within the LCx as compared to the other epicardial coronary arteries. These varied patterns reflect differing stages in the disease process or differing pathogenic milieu across the coronary arteries.

Belardo J, Zhang S, **Castillo E**, Castillo R, Rusthoven C, Jones B, Miften M, **Guerrero T**, **Grills I**, Chen Y, Forghani F, Sullivan P and Vinogradskiy Y (2022). "Does lung function imaging modality have a dosimetric impact on functional avoidance treatment planning: Assessment using prospective clinical trial data." Medical Physics 49(6): E514-E514.

[Full Text](#)

*Department of Radiation Oncology*

Belovich AN, Bahner I, Bonaminio G, Brenneman A, Brooks WS, Chinn C, El-Sawi N, Habal S, Haight M, Haudek SB, Ikonke U, **McAuley RJ**, McKell D, Rowe R, **Taylor TAH**, Thesen T and Vari RC (2022). "Back to the future: Maximizing student learning and wellbeing in the virtual age." Medical Science Educator 32(2): 591-597.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

The virtual age of learning is no longer a concern of the future. It is here. The Fall 2021 Webinar Audio Series (WAS) of the International Association of Medical Science Educators (IAMSE), titled "Back to the Future: Maximizing Student Learning and Wellbeing in the Virtual Age," was designed to help health science educators equip themselves with tools to teach the next generation of health care professionals successfully. From September 2, 2021 to September 30, 2021, the Fall 2021 Series was broadcast live to audiences at academic institutions worldwide in five weekly webinars. This five-part webinar series explored theories and best practices in delivering content over virtual and online media while simultaneously promoting a positive learning environment and enhanced student wellbeing.

Bischof JJ, Elsaid MI, Bridges JFP, Rosko AE, Presley CJ, Abar B, Adler D, **Bastani A**, Baugh CW, Bernstein SL, Coyne CJ, Durham DD, Grudzen CR, Henning DJ, Hudson MF, Klotz A, Lyman GH, Madsen TE, Reyes-Gibby CC, Rico JF, Ryan RJ, Shapiro NI, **Swor R**, Thomas CR, Venkat A, Wilson J, Yeung SCJ, Yilmaz S and Caterino JM (2022). "Characterization of older adults with cancer seeking acute emergency department care: A prospective observational study." Journal of Geriatric Oncology. ePub Ahead of Print.

[Full Text](#)

*Department of Emergency Medicine*

Introduction: Disparities in care of older adults in cancer treatment trials and emergency department (ED) use exist. This report provides a baseline description of older adults  $\geq 65$  years

old who present to the ED with active cancer. Materials and Methods: Planned secondary analysis of the Comprehensive Oncologic Emergencies Research Network observational ED cohort study sponsored by the National Cancer Institute. Of 1564 eligible adults with active cancer, 1075 patients were prospectively enrolled, of which 505 were  $\geq 65$  years old. We recruited this convenience sample from eighteen participating sites across the United States between February 1, 2016 and January 30, 2017. Results: Compared to cancer patients younger than 65 years of age, older adults were more likely to be transported to the ED by emergency medical services, have a higher Charlson Comorbidity Index score, and be admitted despite no significant difference in acuity as measured by the Emergency Severity Index. Despite the higher admission rate, no significant difference was noted in hospitalization length of stay, 30-day mortality, ED revisit or hospital admission within 30 days after the index visit. Three of the top five ED diagnoses for older adults were symptom-related (fever of other and unknown origin, abdominal and pelvic pain, and pain in throat and chest). Despite this, older adults were less likely to report symptoms and less likely to receive symptomatic treatment for pain and nausea than the younger comparison group. Both younger and older adults reported a higher symptom burden on the patient reported Condensed Memorial Symptom Assessment Scale than to ED providers. When treating suspected infection, no differences were noted in regard to administration of antibiotics in the ED, admissions, or length of stay  $\leq 2$  days for those receiving ED antibiotics. Discussion: We identified several differences between older ( $\geq 65$  years old) and younger adults with active cancer seeking emergency care. Older adults frequently presented for symptom-related diagnoses but received fewer symptomatic interventions in the ED suggesting that important opportunities to improve the care of older adults with cancer in the ED exist.

Boothby-Shoemaker W, **Rehman R**, Hamzavi I, Huggins RH and Mohammad TF (2022). "Recommendations to optimize patient care in hidradenitis suppurativa clinics: Our experience." Dermatology. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

Borrelli M, Nasrollahi T, Ulloa R, **Raskin J**, Ference E and Tang DM (2022). "Invasive fungal sinusitis during active COVID-19 infection." Ear Nose and Throat Journal. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

This case study demonstrates a 58-year-old female who contracted COVID-19 post-vaccination presenting with severe left-sided facial pain, headaches, and dyspnea. A computed tomography was ordered and showed acute sinusitis, and upon bedside endoscopy, the patient was shown to have necrosis of the left-sided middle turbinate with no discoloration, palate necrosis, or facial changes. All samples of the necrotic tissue were reported to be invasive fungal sinusitis. The entire turbinate was resected in the operating room and ethmoid, frontal, and maxillary sinuses were healthy. Chest x-rays post-operatively showed pulmonary effusions and edema although the patient was not stable enough for a lung examination to rule out a pulmonary fungal infection. A bedside endoscopy showed no further necrosis post-operatively although a repeat endoscopy showed duskiness at the lateral attachment of the basal lamella right at the most posterior resection of the middle turbinate. The patient was placed on multiple antifungal agents. The patient remained in hypoxemic respiratory failure and septic shock while on pressors and 2 weeks following this, expired. Post-COVID-19 patients have been shown in the literature to have an increased risk of developing invasive fungal sinusitis (IFS) and all IFS cases

during active COVID-19 infection have had a 100% mortality rate.

Boshara P and **Ayala EC** (2022). "Diffuse alveolar hemorrhage due to hydralazine-induced lupus." American Journal of Respiratory and Critical Care Medicine 205: A2633.

[Full Text](#)

*Department of Internal Medicine/Pulmonary and Critical Care Medicine*

Boudiab EM, Peshel EC, **Ibrahim Y**, Gupta R, **Chaiyasate K**, **Shaheen K**, **Rontal M**, **Thottam P** and **Ysunza PA** (2022). "Treatment of VPI with customized pharyngeal flaps: One size does not fit all." Plastic and Reconstructive Surgery-Global Open 10(4): e4255.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Surgery*

*Department of Physical Medicine and Rehabilitation*

**Brummett A** and Eberl JT (2022). "The many metaphysical commitments of secular clinical ethics: Expanding the argument for a moral–metaphysical proceduralism." Bioethics. ePub Ahead of Print.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

The rich moral diversity of academic bioethics poses a paradox for the practice of giving moral recommendations in secular clinical ethics: How are ethicists to provide moral guidance in a pluralistic society? The field has responded to this challenge with a “procedural approach,” but defining this term stirs debate. Some have championed a contentless proceduralism, where ethicists work only to help negotiate resolutions among stakeholders without making any moral recommendations. Others have defended a moral proceduralism by claiming that ethicists should make moral recommendations that are grounded in bioethical consensus (e.g., relevant law, policy, professional consensus statements, and bioethics literature), which is secured using moral principles such as respect for persons or justice. In contrast, we develop a moral–metaphysical proceduralism by identifying many metaphysical commitments in points of secular bioethical consensus. The moral–metaphysical view of secular clinical ethics is important because it challenges the discipline to accept the substantive philosophical foundations required to support giving moral recommendations in a pluralistic context, which may lead to further insights about the nature of the field.

**Brummett A**, **Mason-Maready M** and Whiting V (2022). "Catholic hospitals should permit physicians to provide emergency contraception to rape victims as an act of conscientious provision." Linacre Quarterly. ePub Ahead of Print.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

*OUWB Medical Student Author*

While many Catholic hospitals permit the prescription of the emergency contraception drug levonorgestrel for rape victims, some continue to prohibit this practice as a matter of institutional conscience. While the standard approach to this issue has been to offer an argument that levonorgestrel either is or is not morally permissible, we have taken a different tack. We begin by briefly describing and acknowledging that reasonable disagreement exists on this question (part one), and then arguing that the reasonable disagreement itself can serve as a compelling basis for Catholic leadership at hospitals that prohibit emergency contraception for rape victims to accommodate physicians who wish to provide levonorgestrel as a matter of

conscience (part two). We end by anticipating and responding to some objections. © Catholic Medical Association 2022.

**Cascardo C**, Ismail A, **Fullmer J** and **Davila F** (2022). "Anti-NMDA receptor encephalitis with initial negative markers: Diagnostic and therapeutic challenges of a refractory case with 9-month-long follow-up." BMJ Case Reports 15(6): e249126.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Pathology*

*Department of Internal Medicine/Hospitalist Medicine*

Anti-N-methyl-d-aspartate (NMDA) receptor encephalitis is a progressively debilitating, frequently fatal disease caused by autoantibodies against the NMDA receptor. Risk of delayed treatment is high due to variable presentations, lack of awareness and potential false negative diagnostic studies. In this case report, a woman in her 20s presented with psychiatric manifestations and rapidly declined. Dyskinetic movements and dysautonomia were observed. Initial cerebrospinal fluid and serum anti-NMDA receptor antibodies were negative. MRI was inconclusive. Electroencephalography demonstrated extreme delta brush. Pelvic CT revealed an adnexal teratoma. She remained refractory to treatment until day 126 when, after two cycles of cyclophosphamide, she started to improve. She participated in rehabilitation with eventual discharge home on day 269. Recognising the variable presentations of anti-NMDA receptor encephalitis is important in avoiding misdiagnosis and delayed treatment. If clinical suspicion remains high despite negative results, repeat testing should be pursued. Clinical response should guide treatment decisions in refractory cases.

Chagpar AB, Dupont E, Chiba A, Levine EA, Gass JS, Lum S, **Brown E**, Fenton A, Solomon NL, Ollila DW, Murray M, Gallagher K, Howard-McNatt M, Lazar M, Garcia-Cantu C, Walters L, Pandya S, Mendiola A, Namm JP and authors S (2022). "Are we choosing wisely? Drivers of preoperative MRI use in breast cancer patients." American Journal of Surgery 224(1): 8-11.

[Full Text](#)

*Department of Surgery*

Introduction: Factors contributing to the use of preoperative MRI remain poorly understood. Methods: Data from a randomized controlled trial of stage 0–3 breast cancer patients undergoing breast conserving surgery between 2016 and 2018 were analyzed. Results: Of the 396 patients in this trial, 32.6% had a preoperative MRI. Patient age, race, ethnicity, tumor histology, and use of neoadjuvant therapy were significant predictors of MRI use. On multivariate analysis, younger patients with invasive lobular tumors were more likely to have a preoperative MRI. Rates also varied significantly by individual surgeon ( $p < 0.001$ ); in particular, female surgeons (39.9% vs. 24.0% for male surgeons,  $p = 0.001$ ) and those in community practice (58.9% vs. 14.2% for academic,  $p < 0.001$ ) were more likely to order preoperative MRI. Rates declined over the two years of the study, particularly among female surgeons. Conclusions: Preoperative MRI varies with patient age and tumor histology; however, there remains variability by individual surgeon.

Chagpar AB, Howard-McNatt M, Chiba A, Levine EA, Gass JS, Gallagher K, Lum S, Martinez R, Willis AI, Fenton A, Solomon NL, Senthil M, Edmonson D, Namm JP, Walters L, **Brown E**, Murray M, Ollila D, Dupont E and Garcia-Cantu C (2022). "Factors affecting time to surgery in breast cancer patients." American Surgeon 88(4): 648-652.

[Request Form](#)

### *Department of Surgery*

Background: We sought to determine factors affecting time to surgery (TTS) to identify potential modifiable factors to improve timeliness of care. Methods: Patients with clinical stage 0-3 breast cancer undergoing partial mastectomy in 2 clinical trials, conducted in ten centers across the US, were analyzed. No preoperative workup was mandated by the study; those receiving neoadjuvant therapy were excluded. Results: The median TTS among the 583 patients in this cohort was 34 days (range: 1-289). Patient age, race, tumor palpability, and genomic subtype did not influence timeliness of care defined as TTS  $\leq$ 30 days. Hispanic patients less likely to have a TTS  $\leq$ 30 days (P =.001). There was significant variation in TTS by surgeon (P <.001); those practicing in an academic center more likely to have TTS  $\leq$ 30 days than those in a community setting (55.1% vs 19.3%, P <.001). Patients who had a preoperative ultrasound had a similar TTS to those who did not (TTS  $\leq$ 30 days 41.9% vs 51.9%, respectively, P =.109), but those who had a preoperative MRI had a significantly increased TTS (TTS  $\leq$ 30 days 25.0% vs 50.9%, P <.001). On multivariate analysis, patient ethnicity was no longer significantly associated with TTS  $\leq$ 30 (P =.150). Rather, use of MRI (OR:.438; 95% CI:.287-.668, P <.001) and community practice type (OR:.324; 95% CI:.194-.541, P <.001) remained independent predictors of lower likelihood of TTS  $\leq$ 30 days. Conclusions: Preoperative MRI significantly increases time to surgery; surgeons should consider this in deciding on its use.

Chang S, Liu G, Zhao LW, **Zheng WL, Yan D, Chen PT**, Li XP, Yang KY, **Deraniyagala R, Stevens C, Grills I, Chinnaiyan P, Li XQ and Ding XF** (2022). "Redefine the role of spot-scanning proton beam therapy for the single brain metastasis stereotactic radiosurgery." Frontiers in Oncology 12: 804036.

[Full Text](#)

*Department of Radiation Oncology*

**Chao J, Dunn S and Bohra L** (2022). "Amantadine-induced bilateral corneal edema in a pediatric patient." Journal of AAPOS 26(3): 150-152.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Ophthalmology*

Amantadine was originally developed as an antiviral agent for influenza A. However, it also has off-label uses for Parkinson disease, multiple sclerosis, and in the management of extrapyramidal symptoms. The mechanism of action in these conditions has yet to be elucidated. Ocular side effects from systemic amantadine are rare but have been described in three previous reports of amantadine-associated corneal edema in the pediatric population. We present an additional case of amantadine-associated transient visual impairment in a patient, which was associated with significant regression and worsening of his underlying neurodevelopmental status.

**Chao J, Reddy D and Gupta C** (2022). "Intrastromal keratopigmentation for photophobia secondary to traumatic aniridia." American Journal of Ophthalmology Case Reports 26: 101577.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Ophthalmology*

Purpose: To present a case of therapeutic intrastromal keratopigmentation to resolve intractable photophobia secondary to traumatic aniridia in a hypotonus eye. Observations: A 66-year-old male presented with intractable photophobia for several years in the left eye following a ruptured globe and multiple subsequent retinal surgeries for retinal detachments complicated

by proliferative vitreoretinopathy. The patient underwent intrastromal keratopigmentation given surgical limitations due to the presence of hypotony and silicone oil dependence. The patient's symptoms were fully resolved, and the pigmentation remained stable at 18 months. Conclusions/Importance: Keratopigmentation can be an effective surgical approach to managing patients with symptomatic photophobia in eyes where intraocular surgery is not an amenable option.

Chen S, **Qin A**, **Deraniyagala R**, **Ding X**, Peng Y, Liu Y, Zhao C and Deng X (2022). "MRI-based synthetic CT images generated using 3d conditional GAN for IMPT treatment planning." Medical Physics 49(6): E700-E701.

[Full Text](#)

*Department of Radiation Oncology*

Chen S, Zhao L, Zheng W, **Qin A**, **Deraniyagala R** and **Ding X** (2022). "Development of a collision model for advanced proton treatment planning and delivery." Medical Physics 49(6): E861-E861.

[Full Text](#)

*Department of Radiation Oncology*

Cheng OT and **Schlachter DM** (2022). "Teprotumumab in advanced reactivated thyroid eye disease." American Journal of Ophthalmology Case Reports 26: 101484.

[Full Text](#)

*Department of Ophthalmology*

Purpose: To report the case of a patient with reactivated, refractory thyroid eye disease (TED) treated with teprotumumab. Observations: A 51-year-old female with a 16-year history of thyroid eye disease previously treated with orbital decompression and multiple eyelid surgeries presented in a recurrent flare of the disease. The disease recurrence was refractory to intravenous steroid therapy and only partially responsive to oral steroid therapy, and the patient developed dysthyroid optic neuropathy in the right eye with decreased visual acuity and color vision. Clinical activity score was 8/10 and proptosis measurements were 27 mm OD and 26 mm OS. The patient underwent treatment with eight infusions of teprotumumab coinciding with a low taper of oral prednisone and experienced resolution of dysthyroid optic neuropathy, decrease of clinical activity score to 1, and dramatic improvement in proptosis (17 mm OD, 17 mm OS) and extraocular muscle size on imaging. Thirty weeks after completion of teprotumumab and 2 weeks after the second dose of the COVID vaccine, she experienced another flare and subsequently underwent bilateral orbital decompressions. Conclusion: This case report suggests teprotumumab may be used in patients with reactivation of longstanding thyroid eye disease. Reduction of extraocular muscle size and improvement in proptosis suggest teprotumumab may be disease-modifying even in advanced cases.

Ciufo DJ, Baker EA, Gehrke CK, **Vaupel ZM** and **Fortin PT** (2022). "Tibial torsion correlates with talar morphology." Foot and Ankle Surgery 28(3): 354-361.

[Full Text](#)

*Department of Orthopaedic Surgery*

Background: There is limited literature on axial rotation of the ankle or variations in anatomy of the talus. We aim to evaluate the rotational profile of the distal tibia and its relationship to talus morphology, radiographic foot-type, and tibiotalar tilt in arthritic ankles. Methods: Preoperative imaging was reviewed in 173 consecutive patients with ankle arthritis. CT measurements were used to calculate tibial torsion and the talar neck-body angle (TNBA). Tibiotalar tilt and foot-type

were measured on weightbearing plain radiographs. Results: Measurements indicated mean external tibial torsion of  $29.2 \pm 9.1^\circ$  and TNBA of  $35.2 \pm 7.5^\circ$  medial. Tibiotalar tilt ranged from  $48^\circ$  varus to  $23.5^\circ$  valgus. A moderate association between increasing external tibial torsion and decreasing TNBA was found ( $\rho = -0.576$ ,  $p < .0001$ ). Weak relationships were found between external tibial torsion and varus tibiotalar tilt ( $\rho = -0.239$ ,  $p = .014$ ) and plantarflexion of the talo-first metatarsal angle ( $\rho = -0.218$ ,  $p < .025$ ). Conclusion: We observed a statistically significant correlation between tibial torsion and morphology of the talus, tibiotalar tilt, and first ray plantarflexion. This previously unreported association may provide information regarding the development of foot and ankle deformity and pathology.

Cole E, Park SH, Kim SJ, Kang KB, Valikodath N, Al-Khaled T, Patel SN, Jonas KE, Ostmo S, Coyner A, Berrocal A, **Drenser KA**, Nagiel A, Horowitz JD, Lee TC, Kalpathy-Cramer J, Chiang MF, Campbell JP and Chan RVP (2022). "Variability in plus disease diagnosis using single and serial images." [Ophthalmology Retina](#). ePub Ahead of Print.

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*Department of Ophthalmology*

Purpose: The purpose of this study is to assess changes in ROP diagnosis in single and serial retinal images. Design: Cohort study. Participants: Cases of retinopathy of prematurity recruited from the i-ROP consortium evaluated by seven graders. Methods: Seven ophthalmologists reviewed both single and three consecutive serial retinal images from 15 ROP cases, and severity was assigned as plus, pre-plus, or none. Imaging data was acquired during routine ROP screening from 2011 to 2015 and a reference standard diagnosis was established for each image. A secondary analysis was performed using the i-ROP deep learning system to assign a vascular severity score (VSS) to each image, ranging from 1-9, with 9 being most severe disease. This score has been previously demonstrated to correlate with the International Classification of ROP. Mean plus disease severity was calculated by averaging 14 labels per image in serial and single images to decrease noise. Main Outcome Measures: Grading severity of ROP as defined by plus, pre-plus, or no ROP. Results: Assessment of serial retinal images changed the grading severity for >50% of the graders, though there was wide variability. Cohen's kappa ranged from 0.29 to 1.0, which showed a wide range of agreement from slight to perfect by each grader. Changes in grading of serial retinal images was noted more commonly in cases of pre-plus disease. The mean severity in cases with a diagnosis of plus disease and no disease did not change between single and serial images. The ROP vascular severity score demonstrated good correlation with the range of expert classifications of plus disease, and overall agreement with the mode class ( $p = 0.001$ ). The VSS correlated with mean plus disease severity by expert diagnosis (correlation coefficient 0.89). More aggressive graders tended to be influenced by serial images to increase the severity of their grading. The vascular severity score also demonstrated agreement with disease progression across serial images which progressed to pre-plus and plus disease. Conclusions: Clinicians demonstrated variability in ROP diagnosis when presented with both single and serial images. The use of deep learning as a quantitative assessment of plus disease has the potential to standardize ROP diagnosis and treatment.

Culcasi R, Vlachaki M and **Snyder M** (2022). "A novel technique to evaluate skin toxicity in breast cancer radiotherapy." [Medical Physics](#) 49(6): E847-E848.

[Full Text](#)

*Department of Radiation Oncology*

Dainty KN, Colquitt B, Bhanji F, Hunt EA, Jefkins T, Leary M, Ornato JP, **Swor RA** and Panchal A (2022).

"Understanding the importance of the lay responder experience in out-of-hospital cardiac arrest: A scientific statement from the American Heart Association." Circulation 145(17): E852-E867.

[Full Text](#)

*Department of Emergency Medicine*

de la Torre RPA, **Ramanathan S**, **Williams AL** and **Perez-Cruet MJ** (2022). "Minimally-invasive Assisted Robotic Spine Surgery (MARSS)." Frontiers in Surgery 9: 884247.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Neurosurgery*

Desai NV, **Zakalik D**, Somerfield MR and Tung NM (2022). "Q and A: A new standard of care for germline BRCA1 and/or BRCA2 mutation carriers with early-stage breast cancer." JCO Oncology Practice 18(6): 427-429.

[Full Text](#)

*Department of Internal Medicine/Hematology-Oncology*

**Dilworth JT**, Griffith KA, Pierce LJ, Jaggi R, **Quinn TJ**, Walker EM, Radawski JD, Dominello MM, **Gustafson GS**, Moran JM, Hayman JA and Vicini FA (2022). "The impact of chemotherapy on toxic effects and cosmetic outcome in patients receiving whole breast irradiation: An analysis within a statewide quality consortium." International Journal of Radiation Oncology Biology Physics 113(2): 266-277.

[Full Text](#)

*Department of Radiation Oncology*

Purpose: We investigated whether the use of chemotherapy before whole breast irradiation (WBI) using either conventional fractionation (CWBI) or hypofractionation (HWBI) is associated with increased toxic effects or worse cosmetic outcome compared with WBI alone. Methods and Materials: We identified 6754 patients who received WBI alone (without a third field covering the superior axillary and supraclavicular nodal regions) with data prospectively collected in a statewide consortium. We reported rates of 4 toxic effects: physician-reported acute moist desquamation, patient-reported acute moderate/severe breast pain, a composite acute toxic effect measure (including moist desquamation and either patient- or physician-reported moderate/significant breast pain), and physician-reported impaired cosmetic outcome at 1 year after WBI. Successive multivariable models were constructed to estimate the effect of chemotherapy on these outcomes. Results: Rates of moist desquamation, patient-reported pain, composite acute toxic effects, and impaired cosmetic outcome were 23%, 34%, 42%, and 10% for 2859 patients receiving CWBI and 13%, 28%, 31%, and 11% for 3895 patients receiving HWBI. Receipt of chemotherapy before CWBI was not associated with higher rates of patient-reported pain, composite acute toxic effects, or impaired cosmetic outcome compared with CWBI without chemotherapy but was associated with more moist desquamation (odds ratio, 1.32 [1.07-1.63]; P = .01). Receipt of chemotherapy before HWBI was not associated with higher rates of any of the 4 toxic effects compared with HWBI alone. Conclusions: In this cohort, use of chemotherapy before WBI was generally well tolerated. CWBI with chemotherapy but not HWBI with chemotherapy was associated with higher rates of moist desquamation. Rates of acute breast pain and impaired cosmetic outcome at 1 year were comparable in patients receiving chemotherapy before either CWBI or HWBI. These data support the use of HWBI after chemotherapy.

Dong M, Liu L, Bilchick KC, **Mehta NK**, Cho YS, Koene RJ, Adabag S, Baranchuk A, Chatterjee NA, Bunch

TJ, Yarmohammadi H and Kwon Y (2022). "Academic cardiac electrophysiologists' perspectives on sleep apnea care." *Sleep and Breathing*. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Purpose: Obstructive sleep apnea syndrome (OSAS) is an important, modifiable risk factor in the pathophysiology of arrhythmias including atrial fibrillation (AF). The purpose of the study was to evaluate cardiac electrophysiologists' (EPs) perception of OSAS. Methods: We designed a 27-item online Likert scale-based survey instrument entailing several domains: (1) relevance of OSAS in EP practice, (2) OSAS screening and diagnosis, (3) perception on treatments for OSAS, (4) opinion on the OSAS care model. The survey was distributed to 89 academic EP programs in the USA and Canada. While the survey instrument questions refer to the term sleep apnea (SA), our discussion of the diagnosis, management, and research on the sleep disorder is more accurately described with the term OSAS. Results: A total of 105 cardiac electrophysiologists from 49 institutions responded over a 9-month period. The majority of respondents agreed that sleep apnea (SA) is a major concern in their practice (94%). However, 42% reported insufficient education on SA during training. Many (58%) agreed that they would be comfortable managing SA themselves with proper training and education and 66% agreed cardiac electrophysiologists should become more involved in management. Half of EPs (53%) were not satisfied with the sleep specialist referral process. Additionally, a majority (86%) agreed that trained advanced practice providers should be able to assess and manage SA. Time constraints, lack of knowledge, and the referral process are identified as major barriers to EPs becoming more involved in SA care. Conclusions: We found that OSAS is widely recognized as a major concern for EP. However, incorporation of OSAS care in training and routine practice lags. Barriers to increased involvement include time constraints and education. This study can serve as an impetus for innovation in the cardiology OSAS care model.

Dowker SR, Smith G, O'Leary M, Missel AL, Trumpower B, Hunt N, Herbert L, Sams W, Kamdar N, Coulter-Thompson EI, Shields T, **Swor R**, Domeier R, Abir M, Friedman CP, Neumar RW and Nallamothu BK (2022). "Assessment of telecommunicator cardiopulmonary resuscitation performance during out-of-hospital cardiac arrest using a standardized tool for audio review." *Resuscitation*. ePub Ahead of Print.

[Full Text](#)

*Department of Emergency Medicine*

Objective: Telecommunicator cardiopulmonary resuscitation (T-CPR) is a critical component of optimized out-of-hospital cardiac arrest (OHCA) care. We assessed a pilot tool to capture American Heart Association (AHA) T-CPR measures and T-CPR coaching by telecommunicators using audio review. Methods: Using a pilot tool, we conducted a retrospective review of 911 call audio from 65 emergency medical services-treated out-of-hospital cardiac arrest (OHCA) patients. Data collection included events (e.g., OHCA recognition), time intervals, and coaching quality measures. We calculated summary statistics for all performance and quality measures. Results: Among 65 cases, the patients' mean age was 64.7 years (SD: 14.6) and 17 (26.2%) were women. Telecommunicator recognition occurred in 72% of cases (47/65). Among 18 non-recognized cases, reviewers determined 12 (66%) were not recognizable based on characteristics of the call. Median time-to-recognition was 76 seconds (n = 40; IQR:39–138), while median time-to-first-instructed-compression was 198 seconds (n = 26; IQR:149–233). In 36 cases where coaching was needed, coaching on compression-depth occurred in 27 (75%); -rate in 28 (78%); and chest recoil in 10 (28%) instances. In 30 cases where repositioning was needed, instruction to position the patient's body flat occurred in 18 (60%) instances, on-back in 22 (73%) instances, and on-ground in 22 (73%) instances. Conclusions: Successful collection of data

to calculate AHA T-CPR measures using a pilot tool for audio review revealed performance near AHA benchmarks, although coaching instructions did not occur in many instances. Application of this standardized tool may aid in T-CPR quality review.

du Fay de Lavallaz J, Zimmermann T, Badertscher P, Lopez-Ayala P, Nestelberger T, Miró Ò, Salgado E, Zaytseva X, Gafner MS, Christ M, Cullen L, Than M, Martin-Sanchez FJ, Di Somma S, Peacock WF, Keller DI, Costabel JP, Sigal A, Puelacher C, Wussler D, Koechlin L, Strebel I, Schuler S, Manka R, Bilici M, Lohrmann J, Kühne M, Breidthardt T, **Clark CL**, Probst M, Gibson TA, Weiss RE, Sun BC and Mueller C (2022). "Performance of the American Heart Association/American College of Cardiology/Heart Rhythm Society versus European Society of Cardiology guideline criteria for hospital admission of patients with syncope." Heart Rhythm. ePub Ahead of Print.

[Request Form](#)

#### *Department of Emergency Medicine*

Background: Current American College of Cardiology/American Heart Association/Heart Rhythm Society (ACC/AHA/HRS) and European Society of Cardiology (ESC) guidelines recommend different strategies to avoid low-yield admissions in patients with syncope. Objective: The purpose of this study was to directly compare the safety and efficacy of applying admission criteria of both guidelines to patients presenting with syncope to the emergency department in 2 multicenter studies. Methods: The international BASEL IX (Basel Syncope Evaluation) study (median age 71 years) and the U.S. SRS (Improving Syncope Risk Stratification in Older Adults) study (median age 72 years) were investigated. Primary endpoints were sensitivity/specificity for the adjudicated diagnosis of cardiac syncope (BASEL IX only) and 30-day major adverse cardiovascular events (30d-MACE). Results: Among 2560 patients in the BASEL IX and 2085 in SRS studies, ACC/AHA/HRS and ESC criteria recommended admission for a comparable number of patients in BASEL IX (27% vs 28%), but ACC/AHA/HRS criteria less often in SRS (19% vs 32%;  $P < .01$ ). Recommendations were discordant in ~25% of patients. In BASEL IX, sensitivity for cardiac syncope and 30d-MACE among patients without admission criteria was comparable for ACC/AHA/HRS and ESC criteria (64% vs 65%,  $P = .86$ ; and 67% vs 71%,  $P = .15$ , respectively). In SRS, sensitivity for 30d-MACE was lower with ACC/AHA/HRS (54%) vs ESC criteria (88%;  $P < .001$ ). Similarly, specificity for cardiac syncope and 30d-MACE in BASEL IX was comparable for both guidelines, but in SRS the ACC/AHA/HRS guidelines showed a higher specificity for 30d-MACE than the ESC guidelines. Conclusion: ACC/AHA/HRS and ESC guidelines showed disagreement regarding admission for 1 in 4 patients and had only modest sensitivity, all indicating possible opportunities for improvements.

Evans LL, Chen CS, Muensterer OJ, Sahlabadi M, Lovvorn HN, **Novotny NM**, Upperman JS, Martinez JA, Bruzoni M, Dunn JCY, Harrison MR, Fuchs JR and Zamora IJ (2022). "The novel application of an emerging device for salvage of primary repair in high-risk complex esophageal atresia." Journal of Pediatric Surgery. ePub Ahead of Print.

[Full Text](#)

#### *Department of Surgery*

Introduction: Preservation of native esophagus is a tenet of esophageal atresia (EA) repair. However, techniques for delayed primary anastomosis are severely limited for surgically and medically complex patients at high-risk for operative repair. We report our initial experience with the novel application of the Connect-EA, an esophageal magnetic compression anastomosis device, for salvage of primary repair in 2 high-risk complex EA patients. Compassionate use was approved by the FDA and treating institutions. Operative Technique: Two approaches using the Connect-EA are described - a totally endoscopic approach and a novel hybrid operative

approach. To our knowledge, this is the first successful use of a hybrid operative approach with an esophageal magnetic compression device. Outcomes: Salvage of delayed primary anastomosis was successful in both patients. The totally endoscopic approach significantly reduced operative time and avoided repeat high-risk operation. The hybrid operative approach salvaged delayed primary anastomosis and avoided cervical esophagostomy. Conclusion: The Connect-EA is a novel intervention to achieve delayed primary esophageal repair in complex EA patients with high-risk tissue characteristics and multi-system comorbidities that limit operative repair. We propose a clinical algorithm for use of the totally endoscopic approach and hybrid operative approach for use of the Connect-EA in high-risk complex EA patients.

**Ezeokoli EU, Borici N, Serrano E, Inneh I, Shenava V and Smith BG (2022).** "Early postoperative infections after closed reduction and percutaneous pinning in type II and type III pediatric supracondylar humerus fractures." Journal of Pediatric Orthopedics. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

Background: Supracondylar humerus fractures (SCHF) are the most common elbow fracture type in children, and one of the most common pediatric fracture types overall. Excellent outcomes are generally reported with closed reduction and pinning (CRPP), but the technique involves leaving the pins outside the skin. External pins can act as a nidus for infection. We characterize the infection complications from SCHF treatment at a single-centre tertiary children's hospital over 10 years. This is the largest series on infectious outcomes after CRPP of SCHF reported to date. Methods: Pediatric patients undergoing CRPP for a type II or type III SCHF from 2011 to 2021 with postsurgical infections within 90 days were identified. Demographic and clinical data were retrieved from medical records. Descriptive statistics were estimated and reported as means or medians with range values or counts with percentages. Results: A total of 18 patients met inclusion criteria, 10 and 8 with type II and III SCHF, respectively. The average age at diagnosis of fracture was 4.7 (2 to 9) years. The average operating time for the index surgery was 29 minutes (12 to 42). The average number of postoperative days until pin removal was 29.8 (18 to 52), and the average number of postoperative days until readmission or visit with symptoms was 38.9 (18 to 77). There was a documented history of a wet cast in 6 patients (33%). Ten (56%) patients presented with fever, and the most common positive culture was methicillin-sensitive *Staphylococcus aureus* (9, 50%). Thirteen (72%) patients returned to the operating room for incision and drainage. There were no cases with continued complications after the original infection after a median follow-up of 63 days (8 to 559). Infection after CRPP of SCHF is a rare adverse event. In our series, it was most often associated with common pathogens and wet casts. The necessity of return to the operating room will vary with the presentation, but if efficaciously treated afterwards with oral antibiotics, there is a low chance of recurrence or subsequent complications. Patients should be carefully instructed in cast care and demonstrate understanding of risks and complications, and to contact their orthopaedist if their cast demonstrates lack of integrity.

Feuerstadt P, Louie TJ, Lashner B, Wang EEL, Diao L, Bryant JA, **Sims M**, Kraft CS, Cohen SH, Berenson CS, Korman LY, Ford C, Litcofsky KD, Lombardo MJ, Wortman JR, Wu H, Auniņš JG, McChalicher CWJ, Winkler JA, McGovern BH, Trucksis M, Henn MR and von Moltke L (2022). "SER-109, an oral microbiome therapy for recurrent *clostridioides difficile* infection." New England Journal of Medicine 386(3): 220-229.

[Full Text](#)

*Department of Internal Medicine/Infectious Disease*

Current therapies for recurrent *Clostridioides difficile* infection do not address the disrupted microbiome, which supports *C. difficile* spore germination into toxin-producing bacteria. SER-109 is an investigational microbiome therapeutic composed of purified Firmicutes spores for the treatment of recurrent *C. difficile* infection. Methods: We conducted a phase 3, double-blind, randomized, placebo-controlled trial in which patients who had had three or more episodes of *C. difficile* infection (inclusive of the qualifying acute episode) received SER-109 or placebo (four capsules daily for 3 days) after standard-of-care antibiotic treatment. The primary efficacy objective was to show superiority of SER-109 as compared with placebo in reducing the risk of *C. difficile* infection recurrence up to 8 weeks after treatment. Diagnosis by toxin testing was performed at trial entry, and randomization was stratified according to age and antibiotic agent received. Analyses of safety, microbiome engraftment, and metabolites were also performed. Results: Among the 281 patients screened, 182 were enrolled. The percentage of patients with recurrence of *C. difficile* infection was 12% in the SER-109 group and 40% in the placebo group (relative risk, 0.32; 95% confidence interval [CI], 0.18 to 0.58;  $P < 0.001$  for a relative risk of  $< 1.0$ ;  $P < 0.001$  for a relative risk of  $< 0.833$ ). SER-109 led to less frequent recurrence than placebo in analyses stratified according to age stratum (relative risk, 0.24 [95% CI, 0.07 to 0.78] for patients  $< 65$  years of age and 0.36 [95% CI, 0.18 to 0.72] for those  $\geq 65$  years) and antibiotic received (relative risk, 0.41 [95% CI, 0.22 to 0.79] with vancomycin and 0.09 [95% CI, 0.01 to 0.63] with fidaxomicin). Most adverse events were mild to moderate and were gastrointestinal in nature, with similar numbers in the two groups. SER-109 dose species were detected as early as week 1 and were associated with bile-acid profiles that are known to inhibit *C. difficile* spore germination. Conclusions: In patients with symptom resolution of *C. difficile* infection after treatment with standard-of-care antibiotics, oral administration of SER-109 was superior to placebo in reducing the risk of recurrent infection. The observed safety profile of SER-109 was similar to that of placebo.

Foglesong A, Rusia A, Mertens A, Schott J, **Bloomingdale R**, **Bowers TR** and **Gallagher MJ** (2022). "Wait for (H)IT: Immediate and complete bypass graft failure due to heparin induced thrombocytopenia." *Journal of the American College of Cardiology* 79(9): 2985-2985.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

**Fried S**, **Suhrawardy A**, **Rehman R**, Al-Jamal M, **Moore D** and Mehregan D (2022). "Metastatic osteosarcoma involving the skin: A systematic review of patient demographics, clinical characteristics, and treatment outcomes." *Journal of the American Academy of Dermatology*. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Orthopaedic Surgery*

Ghassemi N, Castillo R, Castillo E, Jones B, Miften M, Kavanagh B, Lu B, Werner-Wasik M, Miller R, Barta J, **Grills I**, **Guerrero T**, Rusthoven C and Vinogradskiy Y (2022). "Evaluation of variables predicting pulmonary function test (PFT) changes for lung cancer patients treated on a prospective 4DCT-ventilation functional avoidance clinical trial." *Medical Physics* 49(6): E150-E150.

[Full Text](#)

*Department of Radiation Oncology*

Ghimire B, Herrman E, Karki U and **Chisti MM** (2022). "Use of circulating tumour DNA in nasopharyngeal carcinoma to detect minimal residual disease." *BMJ Case Reports* 15(6): e251196.

[Full Text](#)

*Department of Internal Medicine/Hematology-Oncology*

Circulating tumour DNA (ctDNA) is defined as short DNA sequences shed by tumour cells into the systemic circulation. A promising use of ctDNA includes the detection of minimal residual disease (MRD) and is currently being studied in multiple types of solid tumours. Literature for the use of individualised ctDNA in nasopharyngeal carcinoma (NPC) is not available, although circulating Epstein-Barr virus DNA level is validated as a prognostic factor. We present a man in his 40s diagnosed with stage IV NPC who was started on chemotherapy with cis-platinum and gemcitabine. Serial monitoring of ctDNA completed to aid in detecting MRD after treatment demonstrated initial up-trending values correlating with subsequent imaging findings showing progression. Reinitiation of a different chemotherapy regimen significantly improved the ctDNA level, with corresponding imaging exhibiting a similar response. This case provides insight into the potential use of ctDNA in NPC and the benefit of serial ctDNA monitoring during treatment.

Gobbi RG, Videira LD, Dos Santos AA, Saruhashi MB, Lucarini BR, Fernandes RJR, Giglio PN, Pécora JR, Camanho GL and **Hinckel BB** (2022). "Anatomical risk factors for anterior cruciate ligament injury are not important as patellar instability risk factors in patients with acute knee injury." *Journal of Knee Surgery* 35(6): 676-683.

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*Department of Orthopaedic Surgery*

To compare in magnetic resonance imaging the anatomical risk factors for anterior cruciate ligament (ACL) injury and patellar dislocation among patients who suffered acute knee injury, 105 patients with acute knee injury resulting in 38 patellar dislocations (patella group), 35 ACL injuries (ACL group), and 32 meniscus or medial collateral ligament injuries (control group) were included. These groups were compared for risk factors for patellar dislocation (patellar height, trochlear dysplasia, and quadriceps angle of action) and for ACL injury (intercondylar width, posterior inclination of tibial plateaus, and depth of the medial plateau). Univariate analysis found statistically significant differences ( $p < 0.05$ ) between the patella and ACL groups in patellar height (Caton-Deschamps [CD] 1.23 vs. 1.07), trochlear facet asymmetry (55 vs. 68%), PTTG (13.08 vs. 8.01 mm), and the patellar tip and trochlear groove (PTTG) angle (29.5 vs. 13.71 degrees). The patella group also differed from control in medial plateau inclination (4.8 vs. 1.87 degrees), patellar height (CD 1.23 vs 1.08), trochlear facet asymmetry (55 vs. 69%), lateral trochlear inclination (17.11 vs. 20.65 degrees), trochlear depth (4.1 vs. 6.05 mm), PTTG (13.08 vs. 9.85 mm), and the PTTG angle (29.5 vs. 17.88 degrees). The ACL and control groups were similar in all measures. Multivariate analysis found the following significant determinants between the Patella and Control groups: patellar height (CD index, odds ratio [OR]: 80.13,  $p = 0.015$ ), trochlear anatomy (asymmetry of facets M/L, OR: 1.06,  $p = 0.031$ ) and quadriceps action angle (PTTG angle, OR: 1.09,  $p = 0.016$ ); between the ACL and control groups: PTTG angle (OR: 0.936,  $p = 0.04$ ) and female gender (OR: 3.876,  $p = 0.032$ ); and between the patella and ACL groups, the CD index (OR: 67.62,  $p = 0.026$ ), asymmetry of the M/L facets (OR: 1.07,  $p = 0.011$ ) and PTTG angle (OR: 1.16,  $p < 0.001$ ). In conclusion, in patients with acute knee injury, the anatomical factors patellar height, trochlear dysplasia, and quadriceps angle of action were related to the occurrence of patellar dislocation. None of the anatomical factors studied was related to the occurrence of anterior cruciate ligament injury.

**Goldstein JA and Mehta NK** (2022). "Extent of coronary atherosclerosis and ischemic myocardium foment sudden cardiac death." *Catheterization and Cardiovascular Interventions* 99(3): 812-813.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Gopal A, Starr M, Obeid A, Ryan E, Ryan C, Ammar M, Patel L, Forbes N, **Capone A**, Emerson G, Joseph D, Elliott D, Regillo C, Hsu J, Gupta O, Kuriyan A and Yonekawa Y (2022). "Predictors of vision loss after surgery for macula-sparing rhegmatogenous retinal detachment." Current Eye Research. ePub Ahead of Print.

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*Department of Ophthalmology*

Purpose: To determine factors associated with loss of good vision (defined as Snellen visual acuity [VA] < 20/40) after surgery among eyes presenting with macula-on primary rhegmatogenous retinal detachment (RRD) with initial VA  $\geq$ 20/40. Methods: Multicenter, retrospective, cohort study of eyes undergoing scleral buckle (SB), pars plana vitrectomy (PPV), or combined pars plana vitrectomy/scleral buckle (PPV/SB) for non-complex macula-on RRD with initial VA  $\geq$ 20/40. Results: Among 646 eyes with macula-on RRDs with initial VA  $\geq$ 20/40, 106 (16.4%) had VA <20/40 (i.e. lost good vision) at final follow-up. Eyes losing good vision had slightly worse pre-operative logMAR VA (mean  $0.15 \pm 0.10$  [20/28]) compared to eyes that preserved good vision (mean  $0.11 \pm 0.10$  [20/26]) ( $p = 0.004$ ). RRDs extending greater than 6 clock-hours were more likely to lose good vision than smaller detachments (multivariate OR 4.57 [95% CI 1.44–14.51];  $p = 0.0099$ ). Compared to eyes repaired with SB alone, eyes undergoing PPV (multivariate OR 7.22 [95% CI 2.10–24.90];  $p = 0.0017$ ) or PPV/SB (multivariate OR 10.74 [95% CI 3.20–36.11];  $p = 0.0001$ ) were each more likely to lose good vision. Eyes requiring further RRD-related (multivariate OR 8.64 [95% CI 1.47–50.66];  $p < 0.017$ ) and non-RRD related vitreoretinal surgery (multivariate OR 14.35 [95% CI 5.39–38.21];  $p < 0.0001$ ) were more likely to lose good vision. Conclusion: Among macula-on RRDs, loss of good vision was associated with worse vision on presentation, vitrectomy-based procedures, greater extent of detachment, and lack of single surgery success. Understanding predictors of visual outcome in macula-on RRD repair may guide pre-operative counseling regarding visual prognosis.

**Gould DJ, Sawarynski K and Mohiyeddini C** (2022). "Academic management in uncertain times: Shifting and expanding the focus of cognitive load theory during COVID-19 pandemic education." Frontiers in Psychology 13: 647904.

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*Department of Foundational Medical Studies (OU)*

Globally, the COVID-19 pandemic has forced medical education toward more "online education" approaches, causing specific implications to arise for medical educators and learners. Considering an unprecedented and highly threatening, constrained, and confusing social and educational environment caused by the COVID-19 pandemic, we decided to shift the traditional focus of the Cognitive Load Theory (CLT) from students to instructors. In this process, we considered recent suggestions to acknowledge the psychological environment in which learning happens. According to this fundamental fact, "Learning and instructional procedures do not occur in a situational vacuum." Following this assertion, we adapted and implemented principles of CLT to reduce the extraneous load for our faculty to facilitate continued scholarly activity and support the overall wellbeing of our faculty during these trying times. The adoption of these principles enabled our team to cultivate attitudes and skills across multiple domains, such as online presentation technologies, implementing and maintaining a "classroom atmosphere" in a virtual environment, encouraging discussion among large online groups of students, facilitating group work, providing virtual office hours, and proactively planning for subsequent sessions.

Green J, Wright H, Seely D, Legacy M, **Anderson M, Armstrong H**, Martell C, Soles S and Balneaves LG (2022). "A survey of multidisciplinary healthcare providers utilizing the knowintegrativeoncology.org educational platform." BMC Complementary Medicines and Therapy 22(1): 118.

[Full Text](#)

*Department of Family Medicine and Community Health*

Background: Although the vast majority of cancer patients use natural health products (NHPs), 59% of oncology healthcare providers (HCP) report not receiving any education on NHPs. KNOWintegrativeoncology.org (KNOW) is a web-based educational platform that provides up-to-date evidence on NHPs used in cancer care with a user-friendly interface. KNOW is a database of human studies systematically gathered from MEDLINE and EMBASE. We surveyed HCPs before and after accessing KNOW to identify their information needs regarding NHPs in cancer care, their preferred way to receive information, barriers they face accessing NHP information, and to obtain feedback on the website. Methods: Recruitment was done through Beaumont Health Systems, the Society for Integrative Oncology, and the Andrew Weil Centre for Integrative Medicine, University of Arizona. HCPs who consented completed an initial survey and then a follow-up survey after being given access to KNOW for 4-6 weeks. Participants were required to access KNOW at least three times before completion of the follow-up survey. Results: A total of 65 participants completed the initial survey, with 60% (n = 39) from the conventional medical community, 33% (n = 21) from the integrative medicine community, and 7% (n = 5) from the research community. The majority of participants (82%; n = 53) preferred educational websites to email updates, podcasts/webinars, in-house experts, PubMed searches and smartphone apps. The most common barriers identified to accessing information on NHPs were time, accessibility at point-of-care, and credibility of sources. A high number of participants were lost to follow up, with 18 participants demographically representative of the initial sample of 65 completing the follow-up survey. Half (n = 9) of participants stated accessing the KNOW website changed their clinical practice. Close to 90% (n = 16) reported they would recommend KNOW to a colleague. Conclusion: Oncology HCPs reported preferring to use, and already relying on, numerous web-based educational platforms to gather information on NHPs, with time, accessibility, and credibility being common barriers to obtaining information. Our study findings highlight the promise of the KNOW web-based educational platform in reducing barriers to accessing up-to-date information on NHPs in busy cancer care settings.

Grzywacz VP, **Quinn TJ, Almahariq MF**, Siddiqui ZA, Kim SW, **Guerrero TM, Stevens CW** and **Grills IS** (2022). "Trimodality therapy for patients with stage III non-small-cell lung cancer: A comprehensive surveillance, epidemiology, and end results analysis." Cancer Treatment and Research Communications 32: 100571.

[Full Text](#)

*Department of Radiation Oncology*

Purpose: Debate exists regarding the optimal management for patients with stage III non-small-cell lung cancer (NSCLC). Recent inclusion of chemotherapeutic data in the Surveillance, Epidemiology, and End Results (SEER) database has made it possible to identify patients with NSCLC who received chemotherapy. We hypothesized that patients with stage III NSCLC experience improved overall survival from trimodality therapy (TMT) versus definitive chemoradiation therapy (CRT) alone. Materials and Methods: We analyzed the overall survival of stage III NSCLC patients based on the receipt of TMT versus CRT alone. This included crude and adjusted univariate models as well as crude and doubly robust adjusted multivariable analyses, both utilizing propensity score matching and inverse probability of treatment weighting. Factors included in the multivariable analyses included: age, sex, marital status,

income, date of diagnosis, primary site, histology, grade, T stage, N stage, and intended treatment. Planned subset analyses were performed for stage III(N2) patients. Results: Adult patients with stage III NSCLC (N = 9008) from the SEER database were included in our analyses. In our univariate analyses, an overall survival benefit was observed for TMT versus CRT (CrudeHR = 0.58, 95% CI = 0.55-0.61, p < 0.001; AdjHR = 0.58, 95% CI = 0.54-0.61, p < 0.001). This persisted in both crude and doubly robust multivariable analyses (CrudeHR = 0.57, 95% CI = 0.53-0.61, p < 0.001; AdjHR = 0.56, 95% CI = 0.53-0.59, p < 0.001). Patients with stage III(N2) disease also demonstrated a significant benefit to OS with TMT versus CRT alone. Conclusion: The significant difference in overall survival seen with TMT suggests this may be an effective treatment approach for select patients.

Gudipati S and **Hanson I** (2022). "Atrial septostomy used to treat acute right heart failure in COVID-19 patient on ECMO." Journal of the American College of Cardiology 79(9): 2358-2358.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Gupta R, John J, Gupta M and **Shaheen K** (2022). "Venous thromboembolism prophylaxis in plastic surgery patients undergoing facelift." Aesthetic Surgery Journal Open Forum 4: ojac024.

[Full Text](#)

*Department of Surgery*

Background: In 2011, the American Society of Plastic Surgeons approved the Venous Thromboembolism (VTE) Task Force Report, which recommended the use of the Caprini scoring system, which has been adopted for VTE prophylaxis by most surgical societies in America. Objectives: The aim of this study is to investigate the incidence of deep vein thrombosis (DVT) and pulmonary embolism (PE) in patients undergoing facelifts at a single institution who did not undergo VTE chemoprophylaxis based on the Caprini scoring system. Methods: A retrospective chart review was conducted of patients who underwent facelift at a single institution. Patients were included if they were operated on between 2016 and 2021 by the lead surgeon and excluded if they received VTE prophylaxis. Descriptive statistics were conducted to analyze the collected data. Results: In total, 136 patients were isolated after chart review, and no patients were found to have had DVT or VTE. The average Caprini score was 5.625 and ranged from 3 to 10. There were 3 patients with evidence of postoperative hematoma (Caprini score = 5, 5, 7). The overall hematoma percentage was 2.21%. Conclusions: Based on the average Caprini score for the patients, all patients should have received VTE chemoprophylaxis. The authors found no VTE-related events in the patients without chemoprophylaxis. This study suggests that while the Caprini scoring system is a critical diagnostic tool for certain surgical procedures, it might not be optimal in predicting VTE in aesthetic patients undergoing surgical procedures.

**Gupta R**, Mathijs E, Hart J, Bates J, Powers J and **Chaiyasate K** (2022). "May-Thurner syndrome and lymphedema reconstruction." Plastic and Reconstructive Surgery - Global Open 10(6): E4377.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Surgery*

Background: May-Thurner syndrome (MTS) is an anatomical variant that results in compression of the left common iliac vein by the right common iliac artery. Although often asymptomatic, lower extremity swelling/edema, deep venous thrombosis, post-thrombotic syndrome, and eventual lymphedema (due to long-standing venous obstruction) can develop. The clinical management of patients presenting for lymphedema surgery with concomitant or undiagnosed

MTS is not well described. Methods: This review investigates two patients who were evaluated for unilateral lower extremity lymphedema, both of whom were subsequently diagnosed with MTS. Standard imaging (including lymphoscintigraphy, indocyanine green lymphangiography, and magnetic resonance venography) were performed to identify proximal venous obstruction. Treatment was accomplished using vascular surgical management, including stenting of the iliac vein before lymphedema reconstruction with vascularized lymph node transfer and multiple lymphovenous bypass. Results: Both patients we examined in this review had improvement of lymphedema with vascular surgical management. Literature review reveals that MTS has an incidence as high as 20% in the population, although commonly unidentified due to lack of symptomatology. Conclusions: There are no studies documenting the incidence of MTS in patients referred for lymphedema surgical management. Routine studies should be obtained to screen for proximal venous obstruction in patients presenting for surgical management of lower extremity lymphedema. Additional research is needed regarding the approach to managing patients with both MTS and lymphedema. Careful observational and prospective studies may elucidate the appropriate time interval between venous stenting and lymphedema microsurgical reconstruction.

Guzzetti E, Oh JK, Shen M, Dweck MR, Poh KK, **Abbas AE**, Mando R, Pressman GS, Brito D, Tastet L, Pawade T, Falconi ML, de Arenaza DP, Kong W, Tay E, Pibarot P, Song JK and Clavel MA (2022). "Validation of aortic valve calcium quantification thresholds measured by computed tomography in asian patients with calcific aortic stenosis." European Heart Journal of Cardiovascular Imaging 23(5): 717-726.

[Request Form](#)

*Department of Internal Medicine/Cardiovascular Disease*

Aims: Sex-specific thresholds of aortic valve calcification (AVC) have been proposed and validated in Caucasians. Thus, we aimed to validate their accuracy in Asians. Methods and Results: Patients with calcific aortic stenosis (AS) from seven international centres were included. Exclusion criteria were  $\geq$ moderate aortic/mitral regurgitation and bicuspid valve. Optimal AVC and AVC-density sex-specific thresholds for severe AS were obtained in concordant grading and normal flow patients (CG/NF). We included 1263 patients [728 (57%) Asians, 573 (45%) women, 837 (66%) with CG/NF]. Mean gradient was 48 (26-64) mmHg and peak aortic velocity 4.5 (3.4-5.1) m/s. Optimal AVC thresholds were: 2145 Agatston Units (AU) in men and 1301 AU in women for Asians; and 1885 AU in men and 1129 AU in women for Caucasians. Overall, accuracy (% correctly classified) was high and comparable either using optimal or guidelines' thresholds (2000 AU in men, 1200 AU in women). However, accuracy was lower in Asian women vs. Caucasian women (76-78% vs. 94-95%;  $P < 0.001$ ). Accuracy of AVC-density (476 AU/cm<sup>2</sup> in men and 292 AU/cm<sup>2</sup> in women) was comparable to absolute AVC in Caucasians (91% vs. 91%, respectively,  $P = 0.74$ ), but higher than absolute AVC in Asians (87% vs. 81%,  $P < 0.001$ ). There was no interaction between AVC/AVC-density and ethnicity (all  $P > 0.41$ ) with regards to AS haemodynamic severity. Conclusion: AVC thresholds defining severe AS are comparable in Asian and Caucasian populations, and similar to those proposed in the guidelines. However, accuracy of AVC to identify severe AS in Asians (especially women) is sub-optimal. Therefore, the use of AVC-density is preferable in Asians.

**Haines DE** (2022). "What is different about pulsed-field ablation ... everything?" Journal of Cardiovascular Electrophysiology 33(3): 368-370.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

**Halalau A, Sonmez M, Uddin A, Karabon P, Scherzer Z and Keeney S (2022).** "Efficacy of a pharmacist-managed diabetes clinic in high-risk diabetes patients, a randomized controlled trial -"Pharm-MD"." BMC Endocrine Disorders 22(1): 69.

[Full Text](#)

*Department of Internal Medicine*

*OUWB Medical Student Author*

Hamilton T, Macki M, Oh SY, Bazydlo M, Schultz L, Zakaria HM, **Khalil JG, Perez-Cruet M**, Aleem I, Park P, Easton R, Nerenz DR, Schwalb J, Abdulhak M and Chang V (2022). "The association of patient education level with outcomes after elective lumbar surgery: A Michigan Spine Surgery Improvement Collaborative study." Journal of Neurosurgery: Spine 36(6): 883-891.

[Full Text](#)

*Department of Neurosurgery*

*Department of Orthopaedic Surgery*

Objective: Socioeconomic factors have been shown to impact a host of healthcare-related outcomes. Level of education is a marker of socioeconomic status. This study aimed to investigate the relationship between patient education level and outcomes after elective lumbar surgery and to characterize any education-related disparities. Methods: The Michigan Spine Surgery Improvement Collaborative registry was queried for all lumbar spine operations. Primary outcomes included patient satisfaction determined by the North American Spine Society patient satisfaction index, and reaching the minimum clinically important difference of Patient-Reported Outcomes Measurement Information System Physical Function score and return to work up to 2 years after surgery. Multivariate Poisson generalized estimating equation models reported adjusted risk ratios. Results: A total of 26,229 lumbar spine patients had data available for inclusion in this study. On multivariate generalized estimating equation analysis all comparisons were done versus the high school (HS)/general equivalency development (GED)-level cohort. For North American Spine Society satisfaction scores after surgery the authors observed the following: at 90 days the likelihood of satisfaction significantly decreased by 11% ( $p < 0.001$ ) among  $< HS$ , but increased by 1% ( $p = 0.52$ ) among college-educated and 3% ( $p = 0.011$ ) among postcollege-educated cohorts compared to the HS/GED cohort; at 1 year there was a decrease of 9% ( $p = 0.02$ ) among  $< HS$  and increases of 3% ( $p = 0.02$ ) among college-educated and 9% ( $p < 0.001$ ) among postcollege-educated patients; and at 2 years, there was an increase of 5% ( $p = 0.001$ ) among postcollege-educated patients compared to the  $< HS$  group. The likelihood of reaching a minimum clinically important difference of Patient-Reported Outcomes Measurement Information System Physical Function score at 90 days increased by 5% ( $p = 0.005$ ) among college-educated and 9% ( $p < 0.001$ ) among postcollege-educated cohorts; at 1 year, all comparison cohorts demonstrated significance, with a decrease of 12% ( $p = 0.007$ ) among  $< HS$ , but an increase by 6% ( $p < 0.001$ ) among college-educated patients and 14% ( $p < 0.001$ ) among postcollege-educated compared to the HS/GED cohort; at 2 years, there was a significant decrease by 19% ( $p = 0.003$ ) among the  $< HS$  cohort, an increase by 8% ( $p = 0.001$ ) among the college-educated group, and an increase by 16% ( $p < 0.001$ ) among the postcollege-educated group. For return to work, a significant increase was demonstrated at 90 days and 1 year when comparing the HS or less group with college or postcollege cohorts. Conclusions: This study demonstrated negative associations on all primary outcomes with lower levels of education. This finding suggests a potential disparity linked to education in elective spine surgery.

Han X, Lopez-Espina C, Verhoef PA, Spicer A, Bhargava A, Schmalz L, **Sims M**, Palagiri AV, Iyer KV, Crisp MJ, **Halalau A**, **Maddens N**, Gosai F, Syed A, Azad S, Espinosa A, Reddy B and Churpek MM (2022). "Clinical pathways leading to antibiotic initiation in patients with suspected infection and their association with delays and mortality." American Journal of Respiratory and Critical Care Medicine 205: A2373.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*  
*Department of Internal Medicine*

Harmon DJ, **Attardi SM**, Waite JG, Topp KS, Smoot BJ and Farkas GJ (2022). "Predictive factors of academic success in neuromusculoskeletal anatomy among doctor of physical therapy students." Anatomical Sciences Education. ePub Ahead of Print.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Predictors of academic success in anatomy have been studied, but not in Doctor of Physical Therapy (DPT) students. The objectives of this study were: (1) explore predictors of academic success in a DPT anatomy course, (2) evaluate sex-based differences in the predictors of academic success and their influence on anatomy course grade, and (3) investigate the influence of the DPT anatomy course on visual-spatial ability. Forty-nine DPT students completed a demographic questionnaire, Learning and Study Strategies Inventory (LASSI), and Mental Rotations Test (MRT) before the ten-week anatomy course (MRT-1) and repeated the MRT at the end of the course (MRT-2). Anatomy course grade was determined based on quizzes and written and practical examinations. Multiple regression analysis showed significant associations between the predictor variables age ( $P = 0.010$ ) and the LASSI anxiety subscale ( $P = 0.017$ ), which measures anxiety coping, with the anatomy course grade. On the MRT-1, male DPT students attempted and correctly answered more questions than females (both,  $P < 0.0001$ ). Female students had higher LASSI self-regulation and use of academic resources subscale scores (both,  $P < 0.05$ ). In the 44 DPT students that completed the MRT-2, the number of correct and attempted responses increased following the anatomy course ( $P < 0.0001$ ). Age and anxiety coping, but not sex, are predictors of anatomy course grades in DPT students. Mental rotations test scores improved following the anatomy course. The LASSI should be used in other cohorts to identify students with low anxiety subscale scores in order to provide targeted support.

Hart J, Gupta R and **Chaiyasate K** (2022). "Eyelid reanimation with free platysma graft: Final stage of reconstruction after gunshot wound to face." Plastic and Reconstructive Surgery - Global Open 10(6): E4372.

[Full Text](#)

*Department of Surgery*

Patients with gunshot wounds to the face have massive soft tissue and bony damage from projectile and blast injuries. They often require multiple, staged reconstructive surgeries with cross-facial nerve grafting and free muscle flap for re-establishment of facial expression. Injury to or total loss of the facial nerve and branches can result in loss of function of the orbicularis oculi muscle, which leads to the loss of protective mechanisms of eyelid function and blink reflex. The purpose of this article is to provide a literature review and discussion of eyelid reanimation after facial paralysis and to discuss our surgical technique with free platysma muscle grafts of the eyelid. The patient is a 45-year-old man with a history of a gunshot wound to the right face. He underwent multiple reconstructive surgeries in the past, and in preparation for eyelid reanimation, he underwent a cross-facial nerve graft from the left temporal branch to

the right eyelid. At initial postoperative evaluation, the patient was able to close his right eye with minimal lagophthalmos, and at 3-month follow-up, he exhibited stronger blinking reflex. This case demonstrates that a free platysma graft with direct neurotization with cross-facial nerve graft fascicles can be utilized for restoration of spontaneous eyelid animation. However, there may be failure of neurotization and inability of the spontaneous blink reflex to be present. Despite these limitations, we still recommend the utilization of free platysma graft to provide upper eyelid reanimation through cross-facial nerve graft.

**Hasan S**, Babrowicz J, **Waheed MA**, Piche JD, Patel R and Aleem I (2022). "The utility of postoperative bracing on radiographic and clinical outcomes following cervical spine surgery: A systematic review." Global Spine Journal. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

Study Design: Systematic Review. Objectives: To determine the radiographic and clinical utility of postoperative orthoses following cervical spine surgery. Methods: We performed a search of the PubMed, Cochrane Library, Medline Ovid, and SCOPUS databases from inception until November 2021. Eligible studies included outcomes of postoperative bracing vs no bracing following cervical spine surgery. The primary outcome of interest was fusion rates after cervical surgery in braced vs unbraced patients. Secondary outcomes included patient reported outcomes and complication rates. Results: A total of 3232 titles were initially screened. After inclusion criteria were applied, 7 studies (550 patients) were included, which compared results of braced vs unbraced patients after cervical spine surgery. These studies showed acceptable reliability for inclusion based on the Methodical Index for Non-Randomized studies and Critical Appraisal Skills Programme assessment tools. There were no significant differences in fusion rates or complications between braced vs unbraced patients identified in any study. Patient reported pain and quality of life measures between braced and unbraced groups varied amongst studies, without any clear overall advantages favoring either method. Conclusions: This systematic review found that external bracing, though widely used following cervical spine surgery, may not offer any advantages in patient-reported outcomes, as compared to not bracing. In regard to the effect of bracing on fusion rates, no strong consensus can be made as the methods of fusion assessment in the included studies were heterogenous and suboptimal. Future high-quality studies using recommended methods of fusion assessment are needed to adequately address this important question.

Haudek SB, Bahner I, Belovich AN, Bonaminio G, Breneman A, Brooks WS, Chinn C, El-Sawi N, Habal S, Haight M, Ikonne U, **McAuley RJ**, McKell D, Rowe R, Taylor TAH, Thesen T and Vari RC (2022). "How science educators still matter: Leveraging the basic sciences for student success." Medical Science Educator 32(3): 747-753.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

**Herndon P**, Jassal JS and Cramer JD (2022). "Association between e-cigarette use and oral HPV-16 infection." Oral Oncology 125: 105676.

[Full Text](#)

*OUWB Medical Student Author*

Hiller SC, Daignault-Newton S, Rakic I, Linsell S, Conrado B, **Jafri SM**, **Rubenstein R**, Abdelhady M, Fischer CP, Gimenez E, Sarle R, Roberts WW, Maitland C, Yousif R, Elgin R, Galejs L, Konheim J, Leavitt D, Stockall

E, Fontera JR, Wolf JS, Hollingsworth JM, Dauw CA and Ghani KR (2022). "Appropriateness criteria for ureteral stent omission following ureteroscopy for urinary stone disease." *Urology Practice* 9(3): 253-263.

[Full Text](#)

*Department of Urology*

**Introduction:** To bridge the gap between evidence and clinical judgment, we defined scenarios appropriate for ureteral stent omission after uncomplicated ureteroscopy (URS) using the RAND/UCLA Appropriateness Method. We retrospectively assessed rates of appropriate stent omission, with the goal to implement these criteria in clinical practice. **Methods:** A panel of 15 urologists from the MUSIC (Michigan Urological Surgery Improvement Collaborative) met to define uncomplicated URS and the variables that influence stent omission decision making. Over 2 rounds, they scored clinical scenarios for appropriateness criteria (AC) for stent omission based on a combination of variables. AC were defined by median scores of 1 to 3 (inappropriate), 4 to 6 (uncertain) and 7 to 9 (appropriate). Multivariable analysis determined the association of each variable with AC scores. Uncomplicated URS cases in the MUSIC registry were assigned AC scores and stenting rates assessed. **Results:** Seven variables affecting stent decision making were identified. Of the 144 scenarios, 26 (18%) were appropriate, 88 (61%) inappropriate and 30 (21%) uncertain for stent omission. Most scenarios appropriate for omission were pre-stented (81%). Scenarios with ureteral access sheath or stones >10 mm were only appropriate if pre-stented. Stenting rates of 5,181 URS cases correlated with AC scores. Stents were placed in 61% of cases appropriate for omission (practice range, 25% to 98%). **Conclusions:** We defined objective variables and AC for stent omission following uncomplicated URS. AC scores correlated with stenting rates but there was substantial practice variation. Our findings demonstrate that the appropriate use of stent omission is underutilized.

Hollenberg EJ, Lin F, Blaha MJ, Budoff MJ, van den Hoogen IJ, Gianni U, Lu Y, Bax AM, van Rosendael AR, Tantawy SW, Andreini D, Cademartiri F, **Chinnaiyan K**, Choi JH, Conte E, de Araújo Gonçalves P, Hadamitzky M, Maffei E, Pontone G, Shin S, Kim YJ, Lee BK, Chun EJ, Sung JM, Gimelli A, Lee SE, Bax JJ, Berman DS, Sellers SL, Leipsic JA, Blankstein R, Narula J, Chang HJ and Shaw LJ (2022). "Relationship between coronary artery calcium and atherosclerosis progression among patients with suspected coronary artery disease." *JACC: Cardiovascular Imaging* 15(6): 1063-1074.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

**Background:** Among symptomatic patients, it remains unclear whether a coronary artery calcium (CAC) score alone is sufficient or misses a sizeable burden and progressive risk associated with obstructive and nonobstructive atherosclerotic plaque. **Objectives:** Among patients with low to high CAC scores, our aims were to quantify co-occurring obstructive and nonobstructive noncalcified plaque and serial progression of atherosclerotic plaque volume. **Methods:** A total of 698 symptomatic patients with suspected coronary artery disease (CAD) underwent serial coronary computed tomographic angiography (CTA) performed 3.5 to 4.0 years apart. Atherosclerotic plaque was quantified, including by compositional subgroups. Obstructive CAD was defined as  $\geq 50\%$  stenosis. Multivariate linear regression models were used to measure atherosclerotic plaque progression by CAC scores. Cox proportional hazard models estimated CAD event risk (median of 10.7 years of follow-up). **Results:** Across baseline CAC scores from 0 to  $\geq 400$ , total plaque volume ranged from 30.4 to 522.4 mm<sup>3</sup> (P < 0.001) and the prevalence of obstructive CAD increased from 1.4% to 49.1% (P < 0.001). Of those with a 0 CAC score, 97.9% of total plaque was noncalcified. Among patients with baseline CAC  $\leq 100$ , nonobstructive CAD was prevalent (40% and 89% in CAC scores of 0 and 1-99), with plaque

largely being noncalcified. On the follow-up coronary CTA, volumetric plaque growth (P < 0.001) and the development of new or worsening stenosis (P < 0.001) occurred more among patients with baseline CAC  $\geq$ 100. Progression varied compositionally by baseline CAC scores. Patients with no CAC had disproportionate growth in noncalcified plaque, and for every 1 mm<sup>3</sup> increase in calcified plaque, there was a 5.5 mm<sup>3</sup> increase in noncalcified plaque volume. By comparison, patients with CAC scores of  $\geq$ 400 exhibited disproportionate growth in calcified plaque with a volumetric increase 15.7-fold that of noncalcified plaque. There was a graded increase in CAD event risk by the CAC with rates from 3.3% for no CAC to 21.9% for CAC  $\geq$ 400 (P < 0.001). Conclusions: CAC imperfectly characterizes atherosclerotic disease burden, but its subgroups exhibit pathogenic patterns of early to advanced disease progression and stratify long-term prognostic risk.

**Homayouni R**, Hong H, Manda P, Nanduri B and Toby IT (2022). "Editorial: Unleashing innovation on precision public health—highlights from the MCBIOS and MAGC 2021 joint conference." Frontiers in Artificial Intelligence 5: 859700.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Howard B, **Haines DE**, Verma A, Kirchhof N, Barka N, Onal B, Stewart MT and Sigg DC (2022). "Characterization of phrenic nerve response to pulsed field ablation." Circulation: Arrhythmia and Electrophysiology 15(6): e010127.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Background: Phrenic nerve palsy is a well-known complication of cardiac ablation, resulting from the application of direct thermal energy. Emerging pulsed field ablation (PFA) may reduce the risk of phrenic nerve injury but has not been well characterized. Methods: Accelerometers and continuous pacing were used during PFA deliveries in a porcine model. Acute dose response was established in a first experimental phase with ascending PFA intensity delivered to the phrenic nerve (n=12). In a second phase, nerves were targeted with a single ablation level to observe the effect of repetitive ablations on nerve function (n=4). A third chronic phase characterized assessed histopathology of nerves adjacent to ablated cardiac tissue (n=6). Results: Acutely, we observed a dose-dependent response in phrenic nerve function including reversible stunning (R<sup>2</sup>=0.965, P<0.001). Furthermore, acute results demonstrated that phrenic nerve function responded to varying levels of PFA and catheter proximity placements, resulting in either: no effect, effect, or stunning. In the chronic study phase, successful isolation of superior vena cava at a dose not predicted to cause phrenic nerve dysfunction was associated with normal phrenic nerve function and normal phrenic nerve histopathology at 4 weeks. Conclusions: Proximity of the catheter to the phrenic nerve and the PFA dose level were critical for phrenic nerve response. Gross and histopathologic evaluation of phrenic nerves and diaphragms at a chronic time point yielded no injury. These results provide a basis for understanding the susceptibility and recovery of phrenic nerves in response to PFA and a need for appropriate caution in moving beyond animal models.

Howard KK, Makki H, **Novotny NM**, **Mi M** and **Nguyen N** (2022). "Value of robotic surgery simulation for training surgical residents and attendings: A systematic review protocol." BMJ Open 12(6): e059439.

[Full Text](#)

*Department of Surgery*

*Department of Foundational Medical Studies (OU)*

Introduction: Robotic surgery is a method of minimally invasive surgery performed through small incisions using a remote robotic console. Surgical residents and attendings participate in simulation training to be able to effectively perform robotic surgery using wet labs, dry labs and virtual reality platforms. Our objective is to identify the effectiveness of robotic simulation on novice robotic surgeons. This review will answer our review question: To what extent are robotic simulations for training novice robotic general surgery residents and attendings associated with improved outcomes in comparison with no simulation training? Methods and Analysis: A comprehensive search of PubMed, Embase, the Cochrane Library and Web of Science was performed. The studies were then determined to meet initial screening criteria by one individual for abstract and title with full text screening performed by two authors independently and in duplicate. Narrative themes will be collected, analysed and summarised where possible. Ethics and Dissemination: There is no Institutional Review Board approval required given that the work is carried out on previously published papers. The final manuscript and results will be presented and published at an academic conference and peer-reviewed journal.

Hu A, Reiter AJ, Gerardo R, Skertich NJ, Lewit R, Ghani M, Witte A, Kang HS, Richards H, Perry B, Tian Y, Mehl SC, Gonzalez A, **Novotny NM**, Haynes J, Aranda A, Zamora IJ, Rhee D, Fialkowski E, Slater BJ, Van Arendonk K, Gosain A, Lopez ME and Raval MV (2022). "Association between COVID-19 related elective surgery cancellations and pediatric inguinal hernia complications: A nationwide multicenter cohort study." *Surgery*. ePub Ahead of Print.

[Full Text](#)

#### *Department of Surgery*

Background: Optimal inguinal hernia repair timing remains controversial. It remains unclear how COVID-19 related elective surgery cancellations impacted timing of inguinal hernia repair and whether any delays led to complications. This study aims to determine whether elective surgery cancellations are safe in pediatric inguinal hernia. Methods: This multicenter retrospective cohort study at 14 children's hospitals included patients  $\leq 18$  years who underwent inguinal hernia repair between September 13, 2019, through September 13, 2020. Patients were categorized by whether their inguinal hernia repair occurred before or after their hospital's COVID-19 elective surgery cancellation date. Incarceration and emergency department encounters were compared between pre and postcancellation. Results: Of 1,404 patients, 604 (43.0%) underwent inguinal hernia repair during the postcancellation period, 92 (6.6%) experienced incarceration, and 213 (15.2%) had an emergency department encounter. The postcancellation period was not associated with incarceration (odds ratio 1.54; 95% confidence interval 0.88-2.71;  $P = .13$ ) or emergency department encounters (odds ratio 1.53; 95% confidence interval 0.94-2.48;  $P = .09$ ) despite longer median times to inguinal hernia repair (precancellation 29 days [interquartile range 13-55 days] versus postcancellation 31 days [interquartile range 14-73 days],  $P = .01$ ). Infants were more likely to have the emergency department be their index presentation in the postcancellation period (odds ratio 1.69; 95% confidence interval 1.24-2.31;  $P < .01$ ). Conclusion: Overall, COVID-19 elective surgery cancellations do not appear to increase the likelihood of incarceration or emergency department encounters despite delays in inguinal hernia repair, suggesting that cancellations are safe in children with inguinal hernia. Assessment of elective surgery cancellation safety has important implications for health policy.

Hwang ES, Beitsch P, Blumencranz P, Carr D, Chagpar A, Clark L, **Dekhne N**, Dodge D, Dyess DL, Gold L, Grobmyer S, Hunt K, Karp S, Lesnikoski BA, Wapnir I and Smith BL (2022). "Clinical impact of

intraoperative margin assessment in breast-conserving surgery with a novel pegulicianine fluorescence-guided system: A nonrandomized controlled trial." *JAMA Surgery*. ePub Ahead of Print.

[Full Text](#)

*Department of Surgery*

Importance: Positive margins following breast-conserving surgery (BCS) are often identified on standard pathology evaluation. Intraoperative assessment of the lumpectomy cavity has the potential to reduce residual disease or reexcision rate following standard of care BCS in real time. Objective: To collect safety and initial efficacy data on the novel pegulicianine fluorescence-guided system (pFGS) when used to identify residual cancer in the tumor bed of female patients undergoing BCS. Design, Setting, and Participants: This prospective single-arm open-label study was conducted as a nonrandomized multicenter controlled trial at 16 academic or community breast centers across the US. Female patients 18 years and older with newly diagnosed primary invasive breast cancer or ductal carcinoma in situ DCIS undergoing BCS were included, excluding those with previous breast cancer surgery and a history of dye allergies. Of 283 consecutive eligible patients recruited, 234 received a pegulicianine injection and were included in the safety analysis; of these, 230 were included in the efficacy analysis. Patients were enrolled between February 6, 2018, and April 10, 2020, and monitored for a 30-day follow-up period. Data were analyzed from April 10, 2020, to August 5, 2021. Interventions: Participants received an injection of a novel imaging agent (pegulicianine) a mean (SD) of 3.2 (0.9) hours prior to surgery at a dose of 1 mg/kg. After completing standard of care (SOC) excision, pFGS was used to scan the lumpectomy cavity to guide the removal of additional shave margins. Main Outcomes and Measures: Adverse events and sensitivity, specificity, and reexcision rate. Results: Of 234 female patients enrolled (median [IQR] age, 62.0 [55.0-69.0] years), 230 completed the trial and 1 patient with a history of allergy to contrast agents had an anaphylactic reaction and recovered without sequelae. Correlation of pFGS with final margin status on a per-margin analysis showed a marked improvement in sensitivity over standard pathology assessment of the main lumpectomy specimen (69.4% vs 38.2%, respectively). On a per-patient level, the false-negative rate of pFGS was 23.7% (9 of 38), and sensitivity was 76.3% (29 of 38). Among 32 patients who underwent excision of pFGS-guided shaves, pFGS averted the need for reexcision in 6 (19%). Conclusions and Relevance: In this pilot feasibility study, the safety profile of pegulicianine was consistent with other imaging agents used in BCS, and was associated with a reduced need for second surgery in patients who underwent intraoperative additional excision of pFGS-guided shaves. These findings support further development and clinical performance assessment of pFGS in a prospective randomized trial.

Iannaccone M, Franchin L, **Hanson ID**, Boccuzzi G, Basir MB, Truesdell AG and O'Neill W (2022). "Timing of impella placement in PCI for acute myocardial infarction complicated by cardiogenic shock: An updated meta-analysis." *International Journal of Cardiology*. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Introduction: The timing of hemodynamic support in acute myocardial infarction complicated by cardiogenic shock (AMICS) has yet to be defined. The aim of this meta-analysis was to evaluate the impact of timing of Impella initiation on early and midterm mortality. Methods: A systematic literature review and meta-analysis was conducted using PubMed and Cochrane databases. All studies reporting short-term mortality rates and timing of Impella placement in AMICS were included. Meta-regression analysis and sensitivity analysis were performed on the primary endpoint, short-term mortality ( $\leq 30$  days), and secondary endpoints (midterm mortality, device-related bleeding, and limb ischemia). Results: Of 1289 studies identified, 13 studies (6810

patients; 2970 patients identified as receiving Impella pre-PCI and 3840 patients receiving Impella during/post-PCI) were included in this analysis. Median age was 63.8 years (IQR 63-65.7); 76% of patients were male, and a high prevalence of cardiovascular risk factors was noted across the entire population. Short-term mortality was significantly reduced in those receiving pre-PCI vs. during/post-PCI Impella support (37.2% vs 53.6%, RR 0.7; CI 0.56-0.88). Midterm mortality was also lower in the pre-PCI Impella group (47.9% vs 73%, RR 0.81; CI 0.68-0.97). The rate of device-related bleeding (RR 1.05; CI 0.47-2.33) and limb ischemia (RR 1.6; CI 0.63-2.15) were similar between the two groups. Conclusion: This analysis suggests that Impella placement prior to PCI in AMICS may have a positive impact on short- and midterm mortality compared with post-PCI, with similar safety outcomes. Due to the observational nature of the included studies, further studies are needed to confirm this hypothesis (CRD42022300372).

Ijaz SH, Minhas AMK, Ghoneem A, Khan SU, Sharma G, **Mehta NK**, Kalra A, Khan SS, Warraich HJ, Michos ED, Nasir K, Virani SS, Ganatra S and Dani SS (2022). "Association of dementia with in-hospital outcomes in primary heart failure and acute myocardial infarction hospitalizations." Progress in Cardiovascular Diseases. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Background: Dementia and cardiovascular diseases contribute to a significant disability and healthcare utilization in the elderly. Objective: The in-hospital treatment patterns and outcomes of heart failure (HF) and acute myocardial infarction (AMI) are not well-studied in this population. Methods: We used the National Inpatient Sample database to identify AMI and HF hospitalizations in adults  $\geq 65$  years between 2016 and 2018. RESULTS: A total of 2,466,369 HF hospitalizations (277,900 with dementia [11.3%]) and 1,094,155 AMI hospitalizations (100,365 with dementia [9.2%]) were identified. Patients with dementia were older (mean age 83.8 vs 78.6 years for HF, and 83.0 vs 75.8 years for AMI) with female predominance (59.0% for HF and 56.0% for AMI) than those without dementia. In adjusted analysis, patients with dementia had higher in-hospital mortality (HF 4.7% vs 3.1%, aOR 1.33 [1.27-1.39] and AMI 9.9% vs 5.9%, aOR 1.23 [1.17-1.30]),  $p < 0.001$ ) and lower mechanical circulatory support utilization. Patients with AMI and dementia were less likely to receive revascularization (including percutaneous coronary intervention, coronary artery bypass grafting, and thrombolysis), vasopressors, and invasive mechanical ventilation. They had a longer mean length of stay (LOS) (5.5 vs 5.3 days for HF and 5.1 vs 4.8 days for AMI,  $p < 0.001$  for both), a lower inflation-adjusted cost of care for AMI (\$15,486 vs \$23,215,  $p < 0.001$ ), and higher rates of transfer to rehabilitation facilities. Conclusion: Patients with dementia admitted for HF or AMI had higher in-hospital mortality, a longer LOS, and were less likely to receive aggressive revascularization interventions after AMI.

Ionescu F, Anusim N, Zimmer M and **Jaiyesimi I** (2022). "Venous thromboembolism prophylaxis in hospitalized sickle cell disease and sickle cell trait patients." European Journal of Haematology. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine/Hematology-Oncology*

Introduction: Sickle trait (Hb SA) or sickle disease (Hb SS) carries increased risk of venous thromboembolism (VTE). Hb SS patients are young and lack common comorbid conditions that qualify them for VTE prophylaxis (VTEP). Methods: Retrospective, multicenter analysis of Hb SS/Hb SA adult patients between January 2013 and December 2018. Results: There were 803 Hb SA (525 patients) and 1020 Hb SS admissions (262 patients). VTEP use was similar between Hb SA and controls (42% vs. 46%;  $p$ -value =.06) and Hb SS and controls (45% vs. 42%;  $p$ -value =.13).

Hb SS/Hb SA patients more frequently received more than half of prescribed doses of VTEP. In multivariate analysis, increasing age and longer hospitalizations were positive predictors. Odds of VTEP use varied with treatment site for Hb SS patients, whereas comorbid conditions, admission hemoglobin and platelet count were not predictive. By contrast, in Hb SA patients, comorbid conditions, higher admission hemoglobin, and higher admission platelet counts raised the odds of VTEP being offered. Conclusions: VTEP is underused in Hb SS/Hb SA patients. There may be a trend toward offering more VTEP in Hb SS disease, but not in Hb SA patients, where VTEP prescribing is driven by comorbid conditions rather than genotype. Patient compliance does not appear to play a major role, but intercenter variability suggests provider education may improve VTEP use.

Jagsi R, Griffith KA, Vicini F, Boike T, Dominello M, **Gustafson G**, Hayman JA, Moran JM, Radawski JD, Walker E, Pierce L, Mietzel MA, Dusseau D, Baldwin K, Heimbürger D, Schipper M, Matuszak M, Abu-Isa E and Narayana V (2022). "Identifying patients whose symptoms are underrecognized during treatment with breast radiotherapy." *JAMA Oncology* 8(6): 887-894.

[Full Text](#)

*Department of Radiation Oncology*

Importance: Understanding whether physicians accurately detect symptoms in patients with breast cancer is important because recognition of symptoms facilitates supportive care, and clinical trials often rely on physician assessments using Common Toxicity Criteria for Adverse Events (CTCAE). Objective: To compare the patient-reported outcomes (PROs) of patients with breast cancer who received radiotherapy from January 1, 2012, to March 31, 2020, with physicians' CTCAE assessments to assess underrecognition of symptoms. Design, Setting, and Participants: This cohort study included a total of 29 practices enrolled in the Michigan Radiation Oncology Quality Consortium quality initiative. Of 13725 patients with breast cancer who received treatment with radiotherapy after undergoing lumpectomy, 9941 patients (72.4%) completed at least 1 PRO questionnaire during treatment with radiotherapy and were evaluated for the study. Of these, 9868 patients (99.3%) were matched to physician CTCAE assessments that were completed within 3 days of the PRO questionnaires. Exposure: Patient and physician ratings of 4 symptoms (pain, pruritus, edema, and fatigue) were compared. Main Outcomes and Measures: We used multilevel multivariable logistic regression to evaluate factors associated with symptom underrecognition, hypothesizing that it would be more common in racial and ethnic minority groups. Results: Of 9941 patients, all were female, 1655 (16.6%) were Black, 7925 (79.7%) were White, and 361 (3.6%) had Other race and ethnicity (including American Indian/Alaska Native, Arab/Middle Eastern, and Asian), either as self-reported or as indicated in the electronic medical record. A total of 1595 (16.0%) were younger than 50 years, 2874 (28.9%) were age 50 to 59 years, 3353 (33.7%) were age 60 to 69 years, and 2119 (21.3%) were 70 years or older. Underrecognition of symptoms existed in 2094 of 6781 (30.9%) observations of patient-reported moderate/severe pain, 748 of 2039 observations (36.7%) of patient-reported frequent pruritus, 2309 of 4492 observations (51.4%) of patient-reported frequent edema, and 390 of 2079 observations (18.8%) of patient-reported substantial fatigue. Underrecognition of at least 1 symptom occurred at least once for 2933 of 5510 (53.2%) of those who reported at least 1 substantial symptom. Factors independently associated with underrecognition were younger age (younger than 50 years compared with 60-69 years: odds ratio [OR], 1.35; 95% CI, 1.14-1.59;  $P < .001$ ; age 50-59 years compared with 60-69 years: OR, 1.19; 95% CI, 1.03-1.37;  $P = .02$ ), race (Black individuals compared with White individuals: OR, 1.56; 95% CI 1.30-1.88;  $P < .001$ ; individuals with Other race or ethnicity compared with White individuals: OR, 1.52; 95% CI, 1.12-2.07;  $P = .01$ ), conventional fractionation (OR, 1.26; 95% CI, 1.10-1.45;  $P = .002$ ), male physician

sex (OR, 1.54; 95% CI, 1.20-1.99; P = .002), and 2-field radiotherapy (without a supraclavicular field) (OR, 0.80; 95% CI, 0.67-0.97; P = .02). Conclusions and Relevance: The results of this cohort study suggest that PRO collection may be essential for trials because relying on the CTCAE to detect adverse events may miss important symptoms. Moreover, since physicians in this study systematically missed substantial symptoms in certain patients, including younger patients and Black individuals or those of Other race and ethnicity, improving symptom detection may be a targetable mechanism to reduce disparities.

Johnson J, Misch E, Chung MT, Hotaling J, **Folbe A**, Svider PF, Cabrera-Muffly C and Johnson AP (2022). "Flipping the classroom: An evaluation of teaching and learning strategies in the operating room." Annals of Otolaryngology, Rhinology and Laryngology 131(6): 573-578.

[Full Text](#)

*Department of Surgery*

Objectives: With increasing restraints on resident's experiences in the operating room, with causes ranging from decreased time available to increasing operating room costs, focus has been placed on how to improve resident's education. The objectives of our study are to (1) determine barriers in education in the operating room, (2) identify effective learning and teaching strategies for residents in the operating room with a focus on the tonsillectomy procedure. Methods: An online survey was sent to all otolaryngology residents and residency programs for which contact information was available from January 2016 to March 2016 with 139 respondents. The 12-question survey focused on information regarding limitations to learning how to perform tonsillectomies as well as difficulties with teaching the same procedure. Resident responses were separated based on PGY level, and analysis was performed using t-tests and Chi squared analysis. Results: Common themes emerged from responses for both teaching and learning how to perform tonsillectomies. A significant limitation in learning the procedure was lack of visualization during the surgery (57% learning vs 60% teaching). For both learners and teachers, the monopolar cautery instrument was found to be the most preferred instrument to use during tonsillectomy (80% each). The majority of resident respondents (93%) felt that an instructional video would be beneficial for both learning and teaching the procedure. Conclusions: Significant limitations for learning and teaching in the operating room were identified for performing tonsillectomies. Future endeavors will focus on resolving these limitations to improve surgical education.

**Kahana A** (2022). "Successful treatment of cicatricial entropion requires control of fibrotic process." Ocular Surgery News 40(12): 4-8.

[Full Text](#)

*Department of Ophthalmology*

Keshinro A, Butler P, Fayanju O, Khabele D, Newman E, Greene W, Ude Welcome A, Joseph K-A, **Stallion A**, Backhus L, Frangos S, DiMaggio C, Berman R, Hasson R, Rodriguez LM, Stain S, Bukur M, Klein MJ, Henry-Tillman R and Barry L (2022). "Examination of intersectionality and the pipeline for black academic surgeons." JAMA Surgery 157(4): 327-334.

[Full Text](#)

*Department of Surgery*

Khemraj RR, Solano C, Patel NM and **Franklin BA** (2022). "Impact of social disparities on cardiovascular disease and COVID-19 outcomes: Barriers to care and preventative interventions." Journal of Cardiopulmonary Rehabilitation and Prevention 42(2): 84-89.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

The COVID-19 pandemic has exposed significant disparities within certain population subsets that manifest through greater disease burden and worse outcomes. In this commentary, we propose specific preventive interventions to address these disparities within the United States.

Klotz AD, Caterino JM, Durham D, Felipe Rico J, Pallin DJ, Grudzen CR, McNaughton C, Marcelin I, Abar B, Adler D, **Bastani A**, Bernstein SL, Bischof JJ, Coyne CJ, Henning DJ, Hudson MF, Lyman GH, Madsen TE, Reyes-Gibby CC, Ryan RJ, Shapiro NI, **Swor R**, Thomas CR, Jr., Venkat A, Wilson J, Jim Yeung SC, Yilmaz S, Stutman R and Baugh CW (2022). "Observation unit use among patients with cancer following emergency department visits: Results of a multicenter prospective cohort from concern." Academic Emergency Medicine 29(2): 174-183.

[Full Text](#)

*Department of Emergency Medicine*

Purpose: Emergency department (ED) visits by patients with cancer frequently end in hospitalization. As concerns about ED and hospital crowding increase, observation unit care may be an important strategy to deliver safe and efficient treatment for eligible patients. In this investigation, we compared the prevalence and clinical characteristics of cancer patients who received observation unit care with those who were admitted to the hospital from the ED. Methods: We performed a multicenter prospective cohort study of patients with cancer presenting to an ED affiliated with one of 18 hospitals of the Comprehensive Oncologic Emergency Research Network (CONCERN) between March 1, 2016 and January 30, 2017. We compared patient characteristics with the prevalence of observation unit care usage, hospital admission, and length of stay. Results: Of 1051 enrolled patients, 596 (56.7%) were admitted as inpatients, and 72 (6.9%) were placed in an observation unit. For patients admitted as inpatients, 23.7% had a length of stay  $\leq 2$  days. The conversion rate from observation to inpatient was 17.1% (95% CI 14.6–19.4) among those receiving care in an observation unit. The average observation unit length of stay was 14.7 h. Patient factors associated ED disposition to observation unit care were female gender and low Charlson Comorbidity Index. Conclusion: In this multicenter prospective cohort study, the discrepancy between observation unit care use and short inpatient hospitalization may represent underutilization of this resource and a target for process change.

Kneen KE, Ngo HG, Ghimire B and **Banka AA** (2022). "Persistent orthostatic hypotension in a patient with acromegaly: Resolution with transsphenoidal hypophysectomy." Cureus 14(4): 24436.

[Full Text](#)

*Department of Internal Medicine/Endocrinology & Metabolism*

Knill C, Sandhu R, **Loughery B**, Lin L, Halford R, Drake D and **Snyder M** (2022). "Commissioning and validation of a Monte Carlo algorithm for spine stereotactic radiosurgery." Medical Physics 49(6): E456-E456.

[Full Text](#)

*Department of Radiation Oncology*

Knill C, Sandhu R, **Loughery B**, Lin L, **Seymour Z**, **Chinnaiyan P**, **Quinn T**, **Almahariq M** and **Deraniyagala R** (2022). "Validation and implementation of a dedicated spine stereotactic radiosurgery treatment planning system." Medical Physics 49(6): E967-E967.

[Full Text](#)

*Department of Radiation Oncology*

Kotsopoulos J, Zamani N, **Rosen B**, McLaughlin JR, Risch HA, Kim SJ, Sun P, Akbari MR and Narod SA (2022). "Impact of germline mutations in cancer-predisposing genes on long-term survival in patients with epithelial ovarian cancer." British Journal of Cancer. ePub Ahead of Print.

[Request Form](#)

*Department of Obstetrics and Gynecology*

Background: Several clinical and tumour factors impact on ovarian cancer survival. It is important to evaluate if germline mutations impact long-term outcomes among patients with epithelial ovarian cancer. Methods: We followed 1422 Ontario women with ovarian cancer. Clinical information was obtained from medical records and vital status was determined by registry linkage. Germline genetic testing was performed for 12 susceptibility genes. We estimated 20-year cancer-specific survival according to various factors. Results: Twenty-year survival was inferior for women with serous cancers vs. other types (22.3% vs. 68.6%;  $P < 0.0001$ ). Of the 1422 patients, 248 (17.4%) carried a germline mutation; 119 BRCA1; 75 BRCA2; 7 in a mismatch repair (MMR) gene and 47 in one of seven other genes. Among serous patients, 20-year survival was similar for women with a BRCA1 (28.9%), BRCA2 (21.2%) or no mutation (21.6%). Among endometrioid patients, 20-year survival was poor for women with a BRCA vs. no mutation (47.3% vs. 70.4%;  $P = 0.004$ ). Six of the seven MMR mutation carriers are currently alive, while all three PALB2 mutation carriers died within 3 years of diagnosis. Among women with Stage III/IV serous cancers, 20-year survival was 9.4% for those with vs. 46.5% for those with no residual disease (HR = 2.91; 95% CI 2.12-4.09,  $P < 0.0001$ ). Conclusions: The most important predictor of long-term survival was no residual disease post surgery. BRCA mutation status was not predictive of long-term survival while those with MMR mutations had excellent survival. Larger studies on PALB2 carriers are needed.

**Kuang SY**, Li X, Yang X and Walter S (2022). "A resolution for the inconsistency in the definitions of tonicity." FASEB Journal 36: R2106.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Introduction: There is great inconsistency in the current definitions of tonicity, which hinders research, teaching, and learning about osmosis across the cell membrane. In this abstract, we 1) show the inconsistency in the literature; 2) reveal what caused it and resolve it. Method: Logical reasoning. Results: 1) The inconsistency Table 1 shows a collection of 14 descriptions/definitions of tonicity classified into 5 categories (Cat.), which indicates that the level of the inconsistency is high and the truth of tonicity is elusive. 2) Causes and resolution of the inconsistency As we illustrated previously<sup>1</sup>, tonicity should be defined in a composite osmosis system, which can be deconstructed into 2 simple osmosis systems that are mirrored:  $S1 -m-S2 = S1 -m-H2O + H2O -m-S2$ , where  $S1$  and  $S2$  are two solutions separated by a membrane ( $m$ ) that is only permeable to  $H2O$  in this abstract. Lack of this understanding is the first cause. Second, the owner of tonicity is wrongly reflected in the definitions of Cat. 1, 2, and 3 in the Table, phrased as "a solution's tonicity" or "the tonicity of a solution". Neither  $S1$  or  $S2$  in  $S1 -m-S2$  owns tonicity because it reflects a comparison of the 2 initial concentrations of the impermeant solute particles in  $S1 -m-S2$  (i.e.,  $OC0(S1)$  and  $OC0(S2)$ ), where  $OC0$  refers to osmotic concentration before osmosis occurs, i.e., time = 0. As in a game that has two players, the result of the game (a qualitative statement of "player 1 won the game" or "player 2 lost the game" or a quantitative score of 12 to 9) reflects a comparison of the points (strengths) of the 2 players, so the game system owns the result. Osmosis in  $S1 -m-S2$  is like a water-competing game between

OC0 (S1 ) and OC0 (S2 ). Tonicity expressed qualitatively as "S1 is hypertonic to S2 " or quantitatively as "300 : 200" if OC0 (S1 ) = 300 mOsm/L and OC0 (S2 ) = 200 mOsm/L, reflects a comparison of the osmotic strengths of OC0 (S1 ) and OC0 (S2 ), thus predicts the result of osmosis, i.e., a change in cell volume<sup>1</sup> . Hence, it is the composite S1 -m-S2 system that owns tonicity (the comparison or prediction or the result of osmosis). "A solution's tonicity" makes it impossible to define tonicity. Knowing the truth of tonicity, the definitions in Cat. 3 fail to define what tonicity is and reflect the result of osmosis inappropriately. The definitions in Cat. 5 obviously make no sense. The 3rd and 4th causes are addressed and resolved in our 2nd and 3rd abstracts titled Resolutions to the Problems of Introducing both Osmolarity and Effective Osmolarity and Origin of the Term "Isotonic", respectively. Conclusions: Tonicity can be expressed in multiple ways. The definitions in Cat. 4 express tonicity appropriately as something relational between S1 and S2 if OC0 is the focus, not osmolarity or effective osmolarity. The last definition in Cat. 4 is accurate among all 14 definitions, with which, the result of osmosis (i.e., the osmotic pressure gradient after osmosis)<sup>3</sup> is used to express tonicity.

**Kuang SY, Walter S, Yang X and Li X (2022).** "Unification of the multiple forms of van 't Hoff's law into one general form." *FASEB Journal* 36: R3763.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Introduction: The first Nobel Prize in Chemistry was awarded to Jacobus Henricus van 't Hoff in 1901 for his discoveries of the laws of chemical dynamics and osmotic pressure ( $\pi$ ) in solutions. The original form of van 't Hoff's law illustrates the relationship between  $\pi$  and the molar concentration (C) of a solution (S) facing a membrane (m) that separates the S and water compartments and is only permeable to water:  $\pi = C \cdot RT$ , where R is the gas constant and T is the absolute temperature. However, in reality, both biological and artificial membranes can be extremely complex, so that facing different m, the resulting fractions of the impermeant solute particles (imp-SP) contributing to  $\pi$  is different. The composition of the total solute particles (TSP that includes imp-SP and permeant SP (p-SP)) in S and their interactions may also be complex. For these reasons, multiple forms of van 't Hoff's law have been developed over time to adapt to the different levels of complexity of solutions and/or membranes. In our previous works, we have done the following: 1) Defined the osmosis setting above as a simple osmosis system (S-m-H<sub>2</sub>O) and the setting of S1 -m-S2 as a composite osmosis system that can be deconstructed into two mirrored simple osmosis systems: S1 -m-H<sub>2</sub>O and H<sub>2</sub>O-m-S2<sup>1, 2</sup> . 2) Addressed the many problems in the current definitions of osmolarity (osmotic concentration, OC) and tonicity<sup>1-6</sup> . 3) Reasoned out what real osmolarity is: the osmotic concentration (OC, the concentration of the imp-SP resulting from the interaction between the composition of S and m) in S-m-H<sub>2</sub>O<sup>1</sup> . OC in boldface is differentiated from OC in regular face. OC is a m-dependent variable during osmosis whose initial value before osmosis occurs (i.e., time = 0) is OC0 , a constant of practical use. 4) Proved the correctness and effectiveness of OC0 in eliminating all the problems we addressed with the current definitions of osmolarity and tonicity<sup>1-6</sup> . Moreover, by applying OC0 to van 't Hoff's law, the multiple forms of the law can be unified into one general form. This presentation demonstrates 1) how this unification occurs; 2) how the unified form can be applied to a composite S1 -m-S2 . Method: Logical reasoning Results: 1. Multiple forms of van 't law and their unification Table 1 shows the unification of the multiple forms of the law into one general form:  $\pi = \mathbf{OC0} \cdot RT$ . 2. Applying the unified form of van 't Hoff's law to a composite osmosis system (S1 -m-S2 ) Figure. 1 illustrates the application of the unified form of the law in S1 -m-S2 :  $\Delta\pi = \Delta\mathbf{OC0} \cdot RT$ . Conclusions: The unification of the multiple forms of van 't Hoff's law using OC0 into a general form ( $\pi = \mathbf{OC0} \cdot RT$ ) is a significant theoretical development of the law.

The original form of the law is a special case of the general form.

**Kuang SY**, Walter S, Yang X and Li X (2022). "Origin of the term "isotonic"." FASEB Journal 36: R2108.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Introduction: In our 1st and 2nd abstracts to EB2022, we addressed the inconsistency in the definitions of tonicity<sup>1</sup> and the problems of introducing both osmolarity and effective osmolarity<sup>2</sup> and resolved these issues. In this abstract, we introduce the origin of the term "isotonic", which further clarifies the confusion about tonicity and leads to an understanding of the membrane (m)-dependency of tonicity, one of the 3 properties of tonicity<sup>3</sup>. Method: Logical reasoning. Results: 1) The term "isotonic" was coined by the botanist Hugo de Vries in the 19th century<sup>4</sup>. In his experimental setup, if S1 caused a certain degree of shrinkage of a cell and S2 caused the same degree of shrinkage of the same cell, then S1 and S2 were considered "isotonic solutions" because they have an equal "water attracting force". We now know that it is the impermeant solute particles (imp-SP) in S1 and S2 that pull water to their compartments in the osmosis systems S1 -m-S3 and S2 -m-S3, respectively, where S3 refers to the intracellular fluid (ICF) of the cell. That time, De Vries seemed not to be aware that when his S1 is isotonic to S2, S1 and S2 are both hypertonic to S3, or vice versa, S3 is hypotonic to S1 and S2. 2) The term "x-tonic (i.e., hypertonic or isotonic or hypotonic)" compares the 2 water attracting forces in an osmosis system, such as S1 -m-S3 or S2 -m-S3. Obviously, it is the imp-SP that exert this "water attracting force" (more appropriately this "pressure"). If we call this pressure "the osmotic tone" (i.e., the osmotic energy or strength), then the meaning of the term "x-tonic" is clear: It compares the 2 osmotic tones in an osmosis system such as S1 -m-S2. Lack of an understanding of this point leads to the following illogical descriptions about tonicity: a common saying "S1 is isotonic to the cell" compares an apple with an orange and another common saying "S1 is isotonic" is not a complete sentence. These illogical statements result from the inconsistency in the definitions of tonicity we addressed previously and increase the level of confusion about what tonicity is, which we have addressed previously 1, 3. 3) The logic that if a cell swells/shrinks in a solution, the solution is hypotonic/hypertonic to ICF is commonly reflected in the literature, but this reverses the cause and effect: It is because the ICF is hypertonic/hypotonic to the solution, so that the ICF wins/loses the water competing game (i.e., osmosis) across the cell membrane, or in other words, the winner (ICF) gains water and volume (cell swelling)/the loser (ICF) loses water and volume (cell shrinkage). Conclusions: This abstract and our previous works listed in the References section together eliminate all problems related to the concept of tonicity.

Kumar M, Peters M, Karabon P and **Brahmamdham P** (2022). "Clostridioides difficile infection after appendectomy: An analysis of short-term outcomes from the NSQIP database." Surgery. ePub Ahead of Print.

[Full Text](#)

*Department of Pediatrics*

Background: Clostridioides difficile infection can be a significant complication in surgical patients. The purpose of this study was to describe the incidence and impact on outcomes of Clostridioides difficile infection in adult patients after appendectomy. Methods: The American College of Surgeons National Surgical Quality Improvement Program data set was used to identify all patients with the primary procedure code of appendectomy between 2016 and 2018. Patient demographics and clinical characteristics were extracted from the database, and descriptive statistics were performed. A multivariate logistic regression was created to identify

predictors of *Clostridioides difficile* infection following appendectomy. Results: A total of 135,272 patients who underwent appendectomy were identified, and of those, 469(0.35%) developed *Clostridioides difficile* infection. Patients with *Clostridioides difficile* infection were more likely to be older (51.23 vs 40.47 years;  $P < .0001$ ), female ( $P = .004$ ), American Society of Anesthesiology score  $>2$  ( $P < .0001$ ), present with septic shock ( $P < .0001$ ), or lack functional independence ( $P < .0001$ ). Patients with *Clostridioides difficile* infection were more likely to have increased operative time (62.9 vs 50.4 minutes;  $P < .0001$ ), have perforated appendicitis (48.9% vs 23.5%;  $P < .0001$ ), and underwent open surgery (7.0% vs 4.0%;  $P = .0006$ ). Postoperatively, patients with *Clostridioides difficile* infection required a longer length of stay (4.8 vs 1.8 days;  $P < .0001$ ), had increased mortality (2.1% vs 0.1%;  $P < .0001$ ), higher incidences of postoperative abscess (14.9% vs 2.9%;  $P < .0001$ ), postoperative sepsis (15.1% vs 4.0%;  $P < .0001$ ), and readmission (30.7% vs 3.4%; all  $P < .0001$ ). On multivariate analysis, older age ( $P < .0001$ ), female sex ( $P = .0043$ ), septic shock ( $P = .0002$ ), open surgery ( $P = .037$ ), and dirty wound class ( $P = .0147$ ) were all independently predictive factors of *Clostridioides difficile* infection after appendectomy. Conclusion: *Clostridioides difficile* infection is an uncommon postoperative complication of appendectomy and is associated with worse outcomes and higher mortality. Older patients, female sex, those with sepsis, and those undergoing open surgery are at higher risk for developing *Clostridioides difficile* infection.

**Liang J, Liu Q, Grills I, Guerrero T, Stevens C and Yan D (2022).** "Using previously registered cone beam computerized tomography images to facilitate online computerized tomography to cone beam computerized tomography image registration in lung stereotactic body radiation therapy." *Journal of Applied Clinical Medical Physics* 23(4): e13549.

[Full Text](#)

*Department of Radiation Oncology*

Purpose: In our conventional image registration workflow, the four-dimensional (4D) CBCT was directly registered to the reference helical CT (HCT) using a dual registration approach within the Elekta XVI software. In this study, we proposed a new HCT–CBCT auto-registration strategy using a previously registered CBCT (CBCTpre) as the reference image and tested its clinical feasibility. Methods: From a previous CBCT session, the registered average 4D CBCT was selected as CBCTpre and the HCT–CBCTpre registration vector from the clinician's manual registration result was recorded. In the new CBCT session, auto-registration was performed between the new average 4D CBCT (CBCTtx) and CBCTpre (CBCTpre–CBCTtx). The overall HCT–CBCTtx registration result was then derived by combining the results from two registrations (i.e., HCT–CBCTpre + CBCTpre–CBCTtx). The results from the proposed method were compared with clinician's manually adjusted HCT–CBCTtx registration results ("ground truth") to evaluate its accuracy using a test dataset consisting of 32 challenging registration cases. Results: The uncertainty of the proposed auto-registration method was  $-0.1 \pm 0.5$ ,  $0.1 \pm 1.0$ , and  $-0.1 \pm 0.7$  mm in three translational directions (lateral, longitudinal, and vertical) and  $0.0^\circ \pm 0.9^\circ$ ,  $0.3^\circ \pm 0.9^\circ$ , and  $0.4^\circ \pm 0.7^\circ$  in three rotation directions, respectively. Two patients (6.3%) had translational uncertainty  $> 2$  mm (max = 3.1 mm) and both occurred in the longitudinal direction. Meanwhile, the uncertainty of the conventional direct HCT–CBCTtx auto-registration was  $-0.4 \pm 2.6$ ,  $-0.2 \pm 7.4$ ,  $-1.4 \pm 3.6$  mm for translations and  $-0.3^\circ \pm 1.2^\circ$ ,  $0.0^\circ \pm 1.6^\circ$ , and  $0.1 \pm 1.1^\circ$  for rotations. Eleven patients (34.4%) had translation uncertainty  $> 2$  mm (max = 26.2 mm) in at least one direction. Accuracy in translation was improved with the new method, while rotation accuracy stayed in the same order. Conclusion: We demonstrated the feasibility of incorporating prior clinical registration knowledge into the online HCT–CBCT registration process. The proposed auto-registration method provides a quick and reliable starting solution for online HCT–CBCT

registration.

**Liang J**, Liu Q, Porter E and **Yan D** (2022). "Real-time tracking diaphragm motion on during-treatment KV cone beam projection images using resnet50." Medical Physics 49(6): E332-E333.

[Full Text](#)

*Department of Radiation Oncology*

Liu G, Zhao L, **Li X**, Zhang S, Dai S, Lu X and **Ding X** (2022). "A novel ultra-high dose rate proton therapy technology: Spot-scanning Proton Arc therapy flaSH (SPLASH)." Medical Physics 49(6): E521-E521.

[Full Text](#)

*Department of Radiation Oncology*

Liu M, Drake D, Lack D, Sigler M, Sliwinski J, Barton K, To D, **Grills I** and **Liang J** (2022). "During-treatment imaging feasibility for intrafraction stereotactic spine treatment evaluations." Medical Physics 49(6): E727-E727.

[Full Text](#)

*Department of Radiation Oncology*

Liu P, Cao X, Gao X, Shang S, Liu J, Wang Z and **Ding X** (2022). "Feasibility of acute hematologic toxicity model-based patient selection for proton beam therapy." Radiotherapy and Oncology 170: S1284-S1285.

[Full Text](#)

*Department of Radiation Oncology*

Liu Q and **Liang J** (2022). "Comparison of aperture complexity between VMAT plans using conventionally flattened (FF) and flattening-filter-free (FFF) beams." Medical Physics 49(6): E422-E423.

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*Department of Radiation Oncology*

Liu Y, Nowacki A, Castillo R, Vinogradskiy Y, **Nair G**, **Stevens C** and **Castillo E** (2022). "Physics-informed machine learning for estimating pulmonary perfusion from non-contrast 4DCT." Medical Physics 49(6): E125-E125.

[Full Text](#)

*Department of Internal Medicine/Pulmonary Care & Critical Medicine*

*Department of Radiation Oncology*

**Loughery B**, Knill C, Sandhu R, Lin L and **Seymour Z** (2022). "Evaluation of 4PI arc positioning for cranial VMAT SRS in elements." Medical Physics 49(6): E956-E957.

[Full Text](#)

*Department of Radiation Oncology*

**Loughery B**, McBrady J and Joiner M (2022). "A team learning initiative in undergraduate medical physics." Medical Physics 49(6): E619-E619.

[Full Text](#)

*Department of Radiation Oncology*

Lum F, Li S, Liu L, Li C, Parke DW, II and **Williams GA** (2022). "The pandemic is not associated with endophthalmitis decrease after anti-vascular endothelial growth factor injections." Ophthalmology

129(6): 719-721.

[Full Text](#)

*Department of Ophthalmology*

Madanat L, Sager M, O'connor D, Thapa B, Aggarwal N, Ghimire B, **Lauter C, Maine GN, Sims M and Halalau A** (2022). "Prognostic value of SARS-COV-2 anti-RBD IGG antibody quantitation on clinical outcomes in hospitalized COVID-19 patients." International Journal of General Medicine 15: 5693-5700.

[Full Text](#)

*Department of Internal Medicine/Allergy-Immunology*

*Department of Pathology*

*Department of Internal Medicine/Infectious Disease*

*Department of Internal Medicine*

Background: Antibody levels against SARS-CoV-2 can be used as an indicator of recent or past vaccination or infection. However, the prognostic value of antibodies targeting the receptor binding protein (anti-RBD) in hospitalized patients is not widely reported. Purpose: Determine prognostic impact of SARS-CoV-2 antibody quantification at the time of admission on clinical outcomes in hospitalized COVID-19 patients. Methods: We conducted a pilot observational study on patients hospitalized with SARS-CoV-2 infection to determine the prognostic impact of antibody quantitation within the first two days of admission. Anti-nucleocapsid IgG (anti-N) and Anti-RBD levels were measured. Anti-RBD level of 500 AU/mL was used as a cutoff to stratify patients. Spearman's rank Coefficient (rs) was used to demonstrate association. Results: Of the 26 patients included, those who were vaccinated more frequently tested positive for Anti-RBD (100% vs 46.2%, P = 0.005) with higher median titer level (623 vs 0, P = 0.011) compared to unvaccinated patients. Anti-N positivity was more frequently seen in unvaccinated patients (53.9% vs 7.7%, P = 0.03). Anti-RBD levels  $\geq$ 500 were associated with lower overall hospital length of stay (LOS)(5 vs 10 days, P = 0.046). The analysis employing a Spearman Rank coefficient demonstrated a strong negative correlation between anti-S titer and LOS (rs=-.515, p = 0.007) and a moderate negative correlation with oxygen needs (rs =-.401, p = 0.042). Conclusion: Anti-RBD IgG levels were associated with lower LOS and oxygen needs during hospitalization. Further studies are needed to determine if levels on admission can be used as a prognostic indicator.

Madanat L, **Seeley E**, Shah K, Mando R, **Hanson I, Abbas A**, Renard BM, **Haines DE** and **Mehta N** (2022). "Transcatheter aortic valve replacement: Does timing of cardiac implantable electronic device implantation impact mortality?" Journal of Interventional Cardiac Electrophysiology. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Internal Medicine/Cardiovascular Disease*

Madanat L, Shah K, **Bloomington R** and **Williamson BD** (2022). "Diaphragmatic pacing as an initial presentation of delayed ventricular lead perforation." Journal of Innovations in Cardiac Rhythm Management 13(5): 5004-5008.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Ventricular lead perforation is an infrequent and potentially fatal complication of pacemakers and implantable cardioverter-defibrillators that typically presents shortly following device

implantation. Delayed lead perforations occurring 1 month after implantation are not widely reported and can have a wide range of presentations ranging from asymptomatic to potentially fatal cardiac tamponade. We describe a case of successful percutaneous lead extraction and revision in a patient who presented 9 months following implantation with an active fixation right ventricular pacing lead with apical perforation. Perforation was suspected when device interrogation showed ventricular sensing without ventricular capture, but with diaphragm stimulation. After an initial X-ray and transthoracic echocardiogram failed to detect it, computed tomography angiography confirmed the myocardial perforation. This case demonstrates the importance of recognizing such a complication following cardiac implantable electronic device implantation regardless of the timeline of presentation. It also serves to highlight the importance of clinical suspicion and awareness of the limitations of imaging for perforation. Transvenous percutaneous lead extraction and revision remains a favored approach due to reduced patient trauma when compared to the open surgical approach.

Maldonado TS, Dexter DJ, **Kado H**, Schor J, Annambhotla S, Mojibian H and Beasley RE (2022).

"Outcomes from the ClotTrieve registry show symptom duration may underestimate deep vein thrombus chronicity." *Journal of Vascular Surgery: Venous and Lymphatic Disorders*. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

**Objective:** The all-comer ClotTrieve Outcomes registry assessed indicators of thrombus chronicity in patients with acute, subacute, and chronic lower extremity deep vein thrombosis (DVT). The effectiveness of the ClotTrieve System (Inari Medical, Irvine, CA) by chronicity subgroup was also assessed and reported here in this subanalysis. **Methods:** All-comer patients with lower extremity DVT were enrolled, with no limitation based on the patients' symptom duration. Chronicity was assessed three times and compared: before the procedure based on symptom duration, during the procedure based on available prethrombectomy imaging, and visual inspection of the extracted thrombus morphology after thrombectomy. Patients were grouped into acute, subacute, and chronic subgroups according to their post-thrombectomy thrombus chronicity based on thrombus morphology. Analyses on baseline and procedural characteristics along with thrombus removal were performed across subgroups. The effectiveness of thrombus removal was determined by Marder scores adjudicated by an independent core laboratory, with a prespecified primary effectiveness end point of complete or near-complete ( $\geq 75\%$ ) thrombus removal. **Results:** Of the 260 treated limbs from 250 patients, using symptom duration alone, 70.7% were considered acute, 20.9% subacute, and 8.4% chronic. Upon visual inspection, the extracted thrombus chronicity was approximately one-third in each subgroup: 32.8% had acute thrombus, 34.8% subacute thrombus, and 32.4% chronic thrombus. Chronicity assessed using symptom duration alone mismatched the post-thrombectomy chronicity in 55.1% of limbs ( $P < .0001$ ) with 49.0% being more chronic than suggested by the patients' duration of symptoms. Chronicity assessed using prethrombectomy imaging mismatched the post-thrombectomy chronicity in 17.5% of limbs ( $P < .0001$ ). No patients received thrombolytics and 99.6% were treated in a single session. Complete or near-complete thrombus removal was achieved in a high percentage of limbs regardless of thrombus chronicity: 90.8%, 81.9%, and 83.8% in limbs with acute, subacute, and chronic thrombus, respectively. **Conclusions:** This subanalysis from the all-comer ClotTrieve Outcomes registry demonstrates that extracted thrombus in DVT may be more chronic than suggested by the patients' duration of symptoms. The addition of imaging is helpful to determine the ability of thrombus to respond to therapy. Irrespective of thrombus chronicity, the ClotTrieve system can

be effective at removing acute, subacute, and chronic thrombus in a single-session procedure without the need for thrombolytics.

Mamidipaka A, **Guina J**, Cameron J, Lemmen A and Kletzka N (2022). "Trauma and suicide attempts among insanity acquittees." Journal of the American Academy of Psychiatry and the Law 50(2): 210104-210121.

[Full Text](#)

*Department of Psychiatry*

Although many studies have assessed trauma as a suicide risk factor, to the authors' knowledge this is the first study of that risk factor among forensic psychiatric populations. Using a cross-sectional self-report survey methodology, this study investigated trauma histories, adverse childhood experiences (ACEs), posttraumatic stress disorder symptoms, and lifetime suicide attempts among forensic hospital patients adjudicated not guilty by reason of insanity (n = 107). About 45 percent reported a previous suicide attempt and 22 percent reported multiple attempts, higher than the general population. The average number of attempts was 1.05 (2.39 among those with at least one attempt). The only PTSD symptoms significantly associated with attempting suicide were negative emotions and anhedonia, both in the cognitive/mood cluster, which was the only one of the four clusters to be significantly associated with attempting suicide. Childhood physical abuse was the only trauma significantly associated with attempting suicide. Higher number of attempts was significantly associated with ACEs (emotional neglect and abuse, sexual abuse, physical neglect, and household members with substance-related problems), number of traumas, substance-related problems (especially from alcohol), arousal symptoms (excessive startle, inattention) and negative emotions. We found several statistically significant suicide risk factors, particularly ACEs. Possible explanations and implications of the results are discussed.

Markel JF, Driscoll JA, Zheng TH, Hughes RE, **Moore DD**, Hallstrom BR and Markel DC (2022). "Causes of early hip revision vary by age and gender: Analysis of data from a statewide quality registry." Journal of Arthroplasty. ePub Ahead of Print.

[Full Text](#)

*Department of Orthopaedic Surgery*

Background: While total hip arthroplasty (THA) is extremely successful, early failures do occur. The purpose of this study was to determine the cause of revision in specific patient demographic groups at 3 time points to potentially help decrease the revision risk. Methods: Data for cases performed between 2012 and 2018 from a statewide, quality improvement arthroplasty registry were used. The database included 79,205 THA cases and 1,433 revisions with identified etiology (1,584 in total). All revisions performed at <5 years from the primary THA were reviewed. Six groups, men/women, <65, 65-75, and >75 years, were compared at revision time points <6 months, <1 year, and <5 years. Results: There were obvious and significant differences between subgroups based on demographics and time points (P < .0001). Seven hundred and fifty-six (53%) of all revisions occurred within 6 months. The most common etiologies within 6 months (756 revisions) were fracture (316, 41.8%), dislocation/instability (194, 25.7%), and infection (98, 12.9%). At this early time point, the most common revision cause was fracture for all age/gender-stratified groups, ranging from 27.6% in young men to 60% in older women. Joint instability became the leading cause for revision after 1 year in all groups. Conclusion: This quality improvement project demonstrated clinically meaningful differences in the reason for THA revision between gender, age, and time from surgery. Strategies based on these data should be employed by surgeons to minimize the factors that lead to revision.

Mburu AW, Itsura PM, Orang'o EO, Tonui PK, Odongo EB, Shaffi AF, Muliro HN, Achia TN, Covens AL and **Rosen BP** (2022). "Epidemiological profile and clinico-pathological features of pediatric gynecological cancers at moi teaching & referral hospital, kenya." *Gynecologic Oncology Reports* 40: 100956.

[Full Text](#)

*Department of Obstetrics and Gynecology*

Background: The main pediatric (0-18 years) gynecologic cancers include stromal carcinomas (juvenile granulosa cell tumors and Sertoli-Leydig cell tumors), genital rhabdomyosarcomas and ovarian germ cell. Outcomes depend on time of diagnosis, stage, tumor type and treatment which can have long-term effects on the reproductive career of these patients. This study seeks to analyze the trends in clinical-pathologic presentation, treatment and outcomes in the cases seen at our facility. This is the first paper identifying these cancers published from sub-Saharan Africa. Method: Retrospective review of clinico-pathologic profiles and treatment outcomes of pediatric gynecologic oncology patients managed at MTRH between 2010 and 2020. Data was abstracted from gynecologic oncology database and medical charts. Results: Records of 40 patients were analyzed. Most, (92.5%, 37/40) of the patients were between 10 and 18 years. Ovarian germ cell tumors were the leading histological diagnosis in 72.5% (29/40) of the patients; with dysgerminomas being the commonest subtype seen in 12 of the 37 patients (32.4%). The patients received platinum-based chemotherapy in 70% of cases (28/40). There were 14 deaths among the 40 patients (35%). Conclusion: Surgery remains the main stay of treatment and fertility-sparing surgery with or without adjuvant platinum-based chemotherapy are the standard of care with excellent prognosis following early detection and treatment initiation. LMICs face several challenges in access to quality care and that affects survival of these patients. Due to its commonality, ovarian germ cell cancers warrant a high index of suspicion amongst primary care providers attending to adnexal masses in this age group.

**McDermott PN** (2022). "Medical linac photon skyshine: Monte Carlo calculations and a methodology for estimates." *Journal of Applied Clinical Medical Physics* 23(4): e13543.

[Full Text](#)

*Department of Radiation Oncology*

It has been shown that a widely quoted formula for estimating medical linac photon skyshine equivalent doses is erroneous. Monte Carlo calculations have been performed to develop an easy method for quickly and accurately estimating skyshine radiation levels and to gain improved physical insight into the skyshine phenomenon. Calculations of linac photon skyshine have been performed for 4, 6, 10, 15, and 18 MV beams for  $10 \times 10$  cm<sup>2</sup> and  $40 \times 40$  cm<sup>2</sup> fields and for a range of room dimensions and roof thicknesses. The effect of flattening filter free beams has been considered. Air kerma rates (AKRs) can be accurately fitted to a simple algebraic formula that is a function of the horizontal distance from the isocenter with a single energy dependent fitting parameter. The AKR, at a height of 1.3 m above level ground, reaches a local maximum at a distance  $d_{max} = 1.5d_w + 1.1h$ , where  $d_w$  is the horizontal distance from the isocenter to the outside of the side wall, and  $h$  is the vertical distance from the isocenter to the top of the roof. For thin roofs, low energy beams lead to significantly more skyshine than high energy beams because low energy photons are more easily scattered through large angles. In the absence of a roof, the maximum skyshine dose rate is on the order of  $8 \times 10^{-7}$  times the dose rate at isocenter. The average energy of the skyshine photons is about 0.15 MeV, and it is remarkably independent of almost all parameters. A simple methodology is outlined for the evaluation of photon skyshine.

**McDermott PN, Sigler MD, Lake IP and Lack D (2022).** "Uncertainties in linac primary barrier transmission values." Journal of Applied Clinical Medical Physics 23(4): e13574.

[Full Text](#)

*Department of Radiation Oncology*

Primary barrier design for linac shielding depends very sensitively on tenth value layer (TVL) data. Inaccuracies can lead to large discrepancies between measured and calculated values of the barrier transmission. Values of the TVL for concrete quoted in several widely used standard references are substantially different than those calculated more recently. The older standard TVL data predict significantly lower radiation levels outside primary barriers than the more recently calculated values under some circumstances. The difference increases with increasing barrier thickness and energy, and it can be as large as a factor of 4 for 18 MV and concrete thickness of 200 cm. This may be due to significant differences in the beam spectra between the earlier and the more recent calculations. Measured instantaneous air kerma rates sometimes show large variations for the same energy and thickness. This may be due to confounding factors such as extra material on, or inside the barrier, variable field size at the barrier, density of concrete, and distal distance from the barrier surface. In some cases, the older TVL data significantly underestimate measured instantaneous air kerma rates, by up to a factor of 3, even when confounding factors are taken into account. This could lead to the necessity for expensive remediation. The more recent TVL values tend to overestimate the measured instantaneous dose rates. Reference TVL data should be computed in a manner that is mathematically consistent with their use in the calculation of air kerma rate outside barriers directly from the linac "dose" rate in MU/min.

McGuire D, Ahdi H, Mielke N and **Bahl A** (2022). "Tamsulosin-induced atrial fibrillation with rapid ventricular response." Cureus 14(6): e25714.

[Full Text](#)

*Department of Emergency Medicine*

McGuire D, Johnson S, Mielke N and **Bahl A** (2022). "Transesophageal echocardiography in the emergency department: A comprehensive guide for acquisition, implementation, and quality assurance." Journal of the American College of Emergency Physicians Open 3(3): e12758.

[Full Text](#)

*Department of Emergency Medicine*

**Mehta NK and Haines DE** (2022). "Are we ready for the next frontier: PFA in the ventricle?" JACC: Clinical Electrophysiology 8(6): 732-734.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Middelberg LK, Leonard JC, Shi J, Aranda A, Brown JC, Cochran CL, Eastep K, Gonzalez R, Haasz M, Herskovitz S, Hoffmann JA, Koral A, Lamoshi A, Levitte S, Lo YHJ, Montminy T, Novak I, Ng K, **Novotny NM**, Parrado RH, Ruan W, Shapiro J, Sinclair EM, Stewart AM, Talathi S, Tavarez MM, Townsend P, Zaytsev J and Rudolph B (2022). "High-powered magnet exposures in children: A multi-center cohort study." Pediatrics 149(3): e2021054543.

[Full Text](#)

*Department of Surgery*

Background and Objectives: High-powered magnets were effectively removed from the US market by the Consumer Product Safety Commission (CPSC) in 2012 but returned in 2016 after

federal court decisions. The United States Court of Appeals for the 10th Circuit cited imprecise data among other reasons as justification for overturning CPSC protections. Since then, incidence of high-powered magnet exposure has increased markedly, but outcome data are limited. In this study, we aim to describe the epidemiology and outcomes in children seeking medical care for high-powered magnets after reintroduction to market. Methods: This is a multicenter, retrospective cohort study of patients aged 0 to 21 years with a confirmed high-powered magnet exposure (ie, ingestion or insertion) at 25 children's hospitals in the United States between 2017 and 2019. Results: Of 596 patients with high-powered magnet exposures identified, 362 (60.7%) were male and 566 (95%) were <14 years of age. Nearly all sought care for magnet ingestion (n = 574, 96.3%), whereas 17 patients (2.9%) presented for management of nasal or aural magnet foreign bodies, 4 (0.7%) for magnets in their genitourinary tract, and 1 patient (0.2%) had magnets in their respiratory tract. A total of 57 children (9.6%) had a life-threatening morbidity; 276 (46.3%) required an endoscopy, surgery, or both; and 332 (55.7%) required hospitalization. There was no reported mortality. Conclusions: Despite being intended for use by those >14 years of age, high-powered magnets frequently cause morbidity and lead to high need for invasive intervention and hospitalization in children of all ages.

Mielke N, Johnson S and **Bahl A** (2022). "Boosters reduce in-hospital mortality in patients with COVID-19: An observational cohort analysis." The Lancet Regional Health - Americas 8: 100227.

[Full Text](#)

#### *Department of Emergency Medicine*

Background: Real-world data on the effectiveness of boosters against COVID-19, especially as new variants continue to emerge, is limited. Our objective was to assess demographic, clinical, and outcome variables of patients requiring hospitalization for severe SARS-CoV-2 infection comparing fully vaccinated and boosted (FV&B), fully vaccinated (FV), and unvaccinated (UV) patients. Methods: This multicenter observational cohort analysis compared demographic, clinical, and outcome variables in FV&B, FV, and UV adults hospitalized for COVID-19. Partially vaccinated (PV) and individuals still hospitalized beyond the designated follow-up date of February 1, 2022 were excluded. The primary endpoint was in-hospital mortality. Secondary endpoints included characteristics and outcomes in subpopulations of intensive care and geriatric (age >65) patients. Findings: Between August 12th, 2021 and January 20th, 2022, 8232 patient encounters had a primary diagnosis of COVID-19 and required inpatient treatment. Of the 8232 encounters requiring hospitalization, 448 (5.8%) were FV&B, 2257 (29.2%) were FV, and 5023 (65.0%) were UV; 357 PV and 147 still hospitalized were excluded. The median age of FV&B cohort was 73 (IQR 62, 82) compared to 70 (IQR 59, 80) for FV and 59 (IQR 45, 71) for UV (0.001). Most patients were female in both the FV&B and UV groups with 51.1% and 51.8%, respectively, while the FV group had a majority of males (51.3%). The median Elixhauser weighted score was 12 (IQR 3, 22) for FV&B, 10 (IQR 2, 20) for FV, and 9 (IQR 0, 17) for UV groups (p < 0.001). In-hospital mortality was 7.1% in the FV&B, 10.3% in the FV group, and 12.8% in the UV group (p < 0.001). The FV&B group had lower in-hospital mortality than both FV and UV groups (p = 0.045 and p = 0.001, respectively). The FV group had lower in-hospital mortality than the UV group (p = 0.004). Interpretation: Fully vaccinated and boosted patients requiring hospital-level care for breakthrough COVID-19 have lower in-hospital mortality than fully vaccinated and unvaccinated patients despite being older and higher risk at baseline. Boosters offer added protection beyond full vaccination in preventing death. As COVID-19 continues to spread, larger expansive trials are needed to further identify risk factors for severe outcomes among the FV&B population. Funding: This research received no specific grant from any funding agency in public, commercial, or not-for-profit sectors.

Miller R, Santangelo T, Forghani-Arani F, Rusthoven C, Chen YX, **Castillo E**, Castillo R, **Guerrero T** and Vinogradskiy Y (2022). "Changes in post-treatment cardiac PET avidity predict overall survival in lung cancer patients treated with chemoradiation: Secondary analysis of the ACRIN 6668/RTOG 0235 clinical trial." Radiotherapy and Oncology 171: 22-24.

[Full Text](#)

*Department of Radiation Oncology*

**Misa M**, Lin W, Yingting Z and Wu W (2022). "Integration of arts and humanities in medicine to develop well-rounded physicians: The roles of health sciences librarians." Journal of the Medical Library Association 110(2): 247-252.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Over the past ten years, there has been a growing interest in integrating arts and humanities in medicine to increase learners' empathy and resilience; improve personal well-being, communication, and observational skills; enhance self-reflection; and promote professionalism. These desired skills and qualities are becoming increasingly important for the physicians of tomorrow. Parallel to curricular interventions of integrating arts and humanities to medical education, there has been an increasing research interest in investigating the impact of such interventions on medical students with respect to improving and sustaining students' empathy as they progress in their medical education and develop their professional identity. Research has yielded interesting findings on the types and effect of the interventions in the medical curriculum. The Association of the American Medical Colleges (AAMC), recognizing the unique and unrealized role of arts and humanities in preparing and equipping physicians for twenty-first-century challenges, proposed seven recommendations for advancing arts and humanities integration into medical education to improve the education, practice, and well-being of physicians and physician learners across the spectrum of medical education. Institutional initiatives of arts and humanities integration in the medical curriculum in response to the AAMC's recommendations afford health sciences librarians expansive opportunities and a new landscape of playing an important role in these initiatives. With their diverse educational background in arts, humanities, social sciences, and many other disciplines and fields, health sciences librarians are poised for meaningful contributions to their institutional goals in developing a humanistic, compassionate workforce of future physicians.

**Mitton KP**, Dailey WA, **Sun M**, **Cicerone AP**, **Santos A**, **Jeong D**, **Drekh M**, **Jones L**, **Kouostas K** and **Schmitz K** (2022). "Frequency of multigenic variants among genes regulating retinal vascular development in FEVR patients." Investigative Ophthalmology & Visual Science 63(7): 518-A0095.

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*Department of Foundational Medical Studies (BH)*

*OUWB Medical Student Author*

Mutter RW, Choi JI, Jimenez RB, Kirova YM, Fagundes M, Haffty BG, Amos RA, Bradley JA, **Chen PY**, **Ding XF**, Carr AM, Taylor LM, Pankuch M, Vega RBM, Ho AY, Nystrom PW, McGee LA, Urbanic JJ, Cahlon O, Maduro JH and MacDonald SM (2022). "Cardiac dose and morbidity in breast cancer patients reply." International Journal of Radiation Oncology Biology Physics 112(5): 1289-1290.

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*Department of Radiation Oncology*

**Nasser B, Bughrara MS, Alakhras H, Nasser Z and Jameel OF** (2022). "Unilateral adrenal hemorrhage: A rare complication of anticoagulant use." Cureus 14(6): 25821.

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*OUWB Medical Student Author*

*Department of Internal Medicine/Hospitalist Medicine*

Nowacki A, **Nair G**, Liu Y, Galban CJ, **Stevens C** and **Castillo E** (2022). "Quantifying COPD disease severity with CT-derived perfusion imaging." Medical Physics 49(6): E574-E574.

[Full Text](#)

*Department of Internal Medicine/Pulmonary and Critical Care Medicine*

*Department of Radiation Oncology*

Omari A, Carniciu AL, **Desai M, Schimmel O, Schlachter DM, Folberg R** and **Kahana A** (2022). "Globe dislocation and optic nerve avulsion following all-terrain vehicle accidents." American Journal of Ophthalmology Case Reports. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Ophthalmology*

Purpose: Open-air motor vehicles present unique trauma risks to the eyes and face. We describe two patients who suffered a crash while riding an all-terrain vehicle (ATV), leading to globe dislocation with optic nerve avulsion in order to raise awareness about the risks associated with ATV accidents. Observations: In both cases, the injury was caused by high-speed trauma to the orbit involving a tree branch. One patient sustained a life threatening arrhythmia requiring a short stay in the intensive care unit, and both patients required emergent surgical management and eventual socket reconstruction. Conclusions and Importance: These cases highlight the need for greater advocacy on behalf of rider safety. The authors encourage ophthalmologists to counsel patients who use ATVs to wear helmets, seatbelts, and protective eyewear to prevent these types of injuries in the future.

Ozcan A, Ahn T, **Akay B** and Menoch M (2022). "Imaging for pediatric blunt abdominal trauma with different prediction rules." Pediatric Emergency Care 38(2): E654-E658.

[Full Text](#)

*Department of Surgery*

Background: Computerized tomography (CT) of the abdomen and pelvis is the standard imaging modality to diagnose intra-abdominal injury (IAI). Clinicians must weigh the risk-benefit of CT compared with the degree of clinical suspicion for an IAI. Pediatric Emergency Care Applied Research Network (PECARN), Streck, and blunt abdominal trauma in children (BATiC) prediction rules have been published to help guide evaluation of these patients. Pediatric Emergency Care Applied Research Network uses history and physical examination findings, whereas Streck and BATiC use examination plus laboratory and imaging findings. At the time of the study, there was not a protocol that was more routinely sited. Our goal was to compare these different prediction rules. Methods: This was a retrospective electronic chart review of all children younger than 18 years presenting for either level 1 or 2 trauma activations at our pediatric emergency department (ED) between June 1, 2015, to June 30, 2017. Charts were manually reviewed for a mechanism concerning for abdominal trauma, and demographic data, history and physical examination findings, laboratory and imaging results per prediction rules, and revisits in 7 days were collected. The prediction rules were applied to all charts that had all data necessary. For study purposes, a score of zero for PECARN and Streck, and score of  $\leq 5$  for

modified BATiC (mBATiC) were defined as “low risk.” Patients with no CT, negative CT, and no new injury found on revisit were classified as “no IAI identified,” and patients with positive CT or revisit with injury found as “IAI identified.” The results were compared via Fisher exact test. Results: A total of 249 patients met the inclusion criteria with a median age of 12 years. Of the low-risk patients, 119 (98.7%) of 121 in PECARN group, 21 (100%) of 21 in Streck, and 48 (85.7%) of 56 in mBATiC group had no IAI identified. None of the low-risk patients required any intra-abdominal intervention. No missed IAI was identified during revisit review. Negative predictive values of all 3 rules were significant for PECARN, Streck, and mBATiC (98.35%, 100%, and 85.71%, respectively). Overall, 27 patients had positive CT results for IAI. Conclusions: The PECARN and Streck rules have high negative predictive values to predict low-risk patients who do not require CT. When laboratory studies are not obtained, PECARN is an effective means of excluding IAI for low-risk patients. When laboratory tests were obtained, the Streck rule performed well. Overall, the results are similar to the past individual studies done on each individual rule. History and physical examination findings are of high importance in pediatric trauma. This study supports limited imaging when no abnormal findings are present in children with blunt torso trauma. This is the only study found in the literature that has compared 3 different prediction rules. Copyright

Pancholi P, Relich RF, Chandrasekaran S, Dunn JJ, Granato PA, Harrington AT, Hansen GT, Ledebner NA, Li Q, **Sims MD**, Uphoff TS, Greene W, Young S and Dhiman N (2022). "Erratum: Multicenter evaluation of the simplexa VZV direct assay for detection of varicella-zoster virus in cerebrospinal fluid and lesion-swab specimens (journal of clinical microbiology (2022) 60:4 (e02355-21) doi: 10.1128/jcm.02355-21)." Journal of Clinical Microbiology 60(5): e02355-21 .

[Full Text](#)

*Department of Internal Medicine/Infectious Disease*

Volume 60, no. 4, e02355-21, 2022, <https://doi.org/10.1128/JCM.02355-21>. Table 2: The values for Ellen and 9939 in the first two rows of data should be switched in the last two columns. The first part of the table should appear as shown here. (Table presented).

Pancholi P, Relich RF, Chandrasekaran S, Dunn JJ, Granato PA, Harrington AT, Hansen GT, Ledebner NA, Li Q, **Sims MD**, Uphoff TS, Greene W, Young S and Dhiman N (2022). "Multicenter evaluation of the simplexa vzv direct assay for detection of varicella-zoster virus in cerebrospinal fluid and lesion-swab specimens (vol 60, e02355-21, 2022)." Journal of Clinical Microbiology 60(5): e02355-21.

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*Department of Internal Medicine/Infectious Disease*

Patek PM, Owda D and **Menoch MJA** (2022). "Anaphyl-crisis: Rising rates of pediatric anaphylaxis." Pediatric Emergency Care. ePub Ahead of Print.

[Full Text](#)

*Department of Pediatrics*

Objectives: Anaphylaxis is a serious allergic reaction that has the potential to be life-threatening if not recognized and managed rapidly. Several regional studies have shown increased incidence of anaphylaxis over the past decade. The objectives of this study were to determine rates of pediatric anaphylaxis in southeast Michigan between January 1, 2010, and December 31, 2019, and to describe the epidemiology of pediatric patients presenting to emergency centers in southeast Michigan with anaphylaxis. Methods: We performed a retrospective chart review of all pediatric patients aged 0 to 17 years presenting to 2 large emergency centers from 2010 to 2019 with a diagnosis of anaphylaxis using International Classification of Diseases, Ninth and

Tenth Revision, Clinical Modification codes. Epidemiological and visit data, including length of stay, use of intravenous medication, and emergency severity index, were extracted and analyzed. Pediatric anaphylaxis rates were calculated based on detected anaphylaxis cases divided by total pediatric emergency department visits to the 2 emergency centers. A Poisson regression model was used to predict rates of anaphylaxis per 100,000 emergency department visits. Results: One thousand three hundred ninety-one pediatric visits for anaphylaxis were identified during a period between January 1, 2010, and December 31, 2019. There was a significant rate of increase in pediatric anaphylaxis cases over the 10-year study period at both suburban emergency centers, with an annual increase of 21% and 13%. There was no significant change in trends in demographic factors. Most anaphylaxis cases were young, White males with private insurance. Most children did not receive intravenous medications (77%). The median length of stay increased by 1.5 hours over the study period and 92% of patients were discharged home. Conclusions: Pediatric emergency center visits and length of stay for anaphylaxis in southeast Michigan have markedly increased over the past 10 years.

**Randall DJ**, Zhang Y, Li H, Hubbard JC and Kazmers NH (2022). "Establishing the minimal clinically important difference and substantial clinical benefit for the pain visual analog scale in a postoperative hand surgery population." *Journal of Hand Surgery* 47(7): 645-653.

[Full Text](#)

*OUWB Medical Student Author*

Purpose: Although the pain visual analog scale (VAS-pain) is a ubiquitous patient-reported outcome instrument, it remains unclear how to interpret changes or differences in scores. Therefore, our purpose was to calculate the minimal clinically important difference (MCID) and substantial clinical benefit (SCB) for the VAS-pain instrument in a nonshoulder hand and upper extremity postoperative population. Methods: Adult postoperative patients treated by 1 of 5 fellowship-trained orthopedic hand surgeons at a single tertiary academic medical center were identified. Inclusion required VAS-pain scores at baseline (up to 3 months before surgery) and follow-up (up to 4 months after surgery), in addition to a response to a pain-specific anchor question at follow-up. The MCID estimates were calculated with (1) the 1/2 standard deviation method; and (2) an anchor-based approach. The SCB estimates were calculated with (1) an anchor-based approach; and (2) a receiver operator curve method that maximized the sensitivity and specificity for detecting a "much improved" pain status. Results: There were 667 and 148 total patients included in the MCID and SCB analyses, respectively. The 1/2 standard deviation MCID estimate was 1.6, and the anchor-based estimate was 1.9. The anchor-based SCB estimate was 2.2. The receiver operator curve analysis yielded an SCB estimate of 2.6, with an area under the curve of 0.72, consistent with acceptable discrimination. Conclusions: We propose MCID values in the range of 1.6 to 1.9 and SCB values in the range of 2.2 to 2.6 for the VAS-pain instrument in a nonshoulder hand and upper extremity postoperative population. Clinical relevance: These MCID and SCB estimates may be useful for powering clinical studies and when interpreting VAS-pain score changes or differences reported in the hand surgery literature. These values are to be applied at a population level, and should not be applied to assess the improvement, or lack thereof, for individual patients.

Raut S, Bhalerao A, Noorani B and **Cucullo L** (2022). "In vitro models of the blood–brain barrier". *Methods in Molecular Biology*. 2492: 25-49.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

Traditional in vitro models can replicate many essential features of drug transport/permeability

across the blood-brain barrier (BBB) but are not entirely projecting in vivo central nervous system (CNS) uptake. Species differences fail to translate experimental therapeutics from the research laboratory to the clinic. Improved in vitro modeling of human BBB is vital for both CNS drug discovery and delivery. High-end human BBB models fabricated by microfluidic technologies offer some solutions to this problem. BBB's complex physiological microenvironment has been established by increasing device complexity in terms of multiple cells, dynamic conditions, and 3D designs. It is now possible to predict the therapeutic effects of a candidate drug and identify new druggable targets by studying multicellular interactions using the advanced in vitro BBB models. This chapter reviews the current as well as an ideal in vitro model of the BBB.

Rojas ORG, Naeem E, Ionescu F, **Castillo E** and **Nair GB** (2022). "A study to compare baseline functional residual capacity and forced vital capacity as a predictor of mortality and hospitalization in a cohort of mild to moderate interstitial lung disease." American Journal of Respiratory and Critical Care Medicine 205: A4715.

[Full Text](#)

*Department of Internal Medicine/Pulmonary & Critical Care Medicine  
Department of Radiation Oncology*

**Saadat S, Fritz C, Tran D, Parry N, Yuhan BT**, Bolduan A and Thorpe E (2022). "A systematic review of cervical ganglioneuromas." OTO Open 6(2): 2473974X221106784.

[Full Text](#)

*OUWB Medical Student Author*

Objective: To perform a systematic review of the literature evaluating clinical characteristics and management of cervical ganglioneuromas (CGNs). Data Sources: PubMed, Embase, and Cochrane Library databases were searched. Data such as patient demographics, imaging, and treatments were obtained. Review Methods: Pertinent studies were downloaded, and the full text was reviewed by 4 authors (N.P., S.S., C.F., D.T.). Results were reported via the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-analyses). Results: Fifty-two studies with 58 patients were identified in the literature. Of the 58 patients, 22 were adults and 36 were pediatric. The most common reported location of CGN was within the parapharyngeal space (76%), followed by the retropharyngeal (19%) and paravertebral/prevertebral (7%) spaces. The most common presenting symptoms included a nontender mass (29.3%), dysphagia (17.2%), and hoarseness (10.3%). Interestingly, the average tumor volume for patients with postoperative Horner's syndrome was 183 mm<sup>3</sup> (n = 21, 47.7%) vs 946 mm<sup>3</sup> in patients without Horner's syndrome (n = 23, 52.3%). This represents a statistically significant finding (P = .018). There exists no significant difference in tumor volumes between adult and pediatric patients with Horner's syndrome (P = .645). Conclusion: CGN is a rare tumor of the sympathetic nervous system. Management should involve complete surgical excision with biopsy. We found that patients with small-volume CGNs are significantly more likely to experience postoperative Horner's syndrome. This finding is independent of age and should therefore be taken into consideration in any patient with suspected CGN.

Sandhu R, Knill C, **Loughery B**, Lin L and **Seymour Z** (2022). "Clinical experience of ExactTrac to guide six degree of freedom fiducial marker based patient positioning for hypo-prostate fractionation." Medical Physics 49(6): E720-E720.

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*Department of Radiation Oncology*

Sardarli K, **Daboul R**, Khanal S and **Zarouk S** (2022). "HIV-associated nephropathy presenting as the first manifestation of HIV 2 infection." American Journal of Kidney Diseases 79(4): S59-S59.

[Full Text](#)

*OUWB Medical Student Author*

*Department of Internal Medicine/Nephrology*

Sarvepalli N, **Dekhne N**, Sebai M and Karabon P (2022). "National trends and survival outcomes of performing immediate breast reconstruction for male breast cancer patients." Annals of Surgical Oncology 29(SUPPL 2): 418-418.

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*Department of Surgery*

Schreuder N, **Ding X** and Li Z (2022). "Fixed beamlines can replace gantries for particle therapy." Medical Physics 49(4): 2097-2100.

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*Department of Radiation Oncology*

Sharma J, **Joshi R**, **Al-Hakim MM** and **Wang AM** (2022). "An unusual case of non-traumatic perilymphatic fistula with acute presentation." Clinical Neuroradiology 32(1): 299-301.

[Full Text](#)

*Department of Neurology*

*Department of Diagnostic Radiology and Molecular Imaging*

*OUWB Medical Student Author*

Shen M, Oh JK, Guzzetti E, Singh GK, Pawade T, Tastet L, Clavel MA, Delgado V, Bax JJ, Dweck MR, **Abbas AE**, Mando R, Falconi ML, de Arenaza DP, Poh KK, Kong W, Tay E, Pressman G, Brito D, Song JK and Pibarot P (2022). "Computed tomography aortic valve calcium scoring in patients with bicuspid aortic valve stenosis." Structural Heart 6(1): 100027.

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*Department of Internal Medicine/Cardiovascular Disease*

Sherman A, Tawney A and **Mehta N** (2022). "Flecainide and propafenone safety in patients with non-ischemic cardiomyopathy." Journal of the American College of Cardiology 79(9): 128-128.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Shimamura Y, Turk M, Qader MA, Shah S, **Topf JM** and Hiremath S (2022). "Potassium-enriched salt to lower stroke risk: A #NephJC editorial on the SSaSS study." Kidney Medicine 4(7): 100489.

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*Department of Internal Medicine/Nephrology*

Śłodki M, Copel JA, Rizzo G, Araujo Junior E, Axt-Fliehdner R, Abuhamad A, Simpson LL, Lee W, DeVore G, **Bahado-Singh R**, Preis K and Respondek-Liberska M (2022). "Fetal cardiology: Is it time to establish a separate independent medicine subspeciality?" Pediatric Cardiology. ePub Ahead of Print.

[Full Text](#)

*Department of Obstetrics and Gynecology*

Smith JT, **Hinckel BB**, Tanaka MJ, Arendt EA, Andrade R and Espregueira-Mendes J (2022). "Advances in patellofemoral disorders," In Koh JL, Kuroda R, Espregueira-Mendes J and Gobbi A (ed). The Patellofemoral Joint: A Case-Based Approach. Cham: Springer International Publishing. pp: 263-271.

[Full Text](#)

*Department of Orthopaedic Surgery*

Numerous advances continue to be made and have contributed to the improvement of the diagnosis and treatment of patellofemoral (PF) disorders. These include technological advances in instrumented laxity, 3D and dynamic CT imaging and computational modeling, devices for implantation, and developments in the field of orthobiologics. The Porto Patellofemoral Testing Device (PPTD) provides a standardized stress-testing system simultaneously during an MRI or CT scan to quantify patellar position and displacement with excellent reliability, accuracy, precision, and low variability as compared to manual physical exam. The use of dynamic CT has begun to improve our ability to quantify the contribution of each pathoanatomic variant on patellar tracking throughout knee range of motion (ROM) and provides a better understanding of the biomechanical effects that corrective surgical techniques have on patellar tracking. Utilizing finite element modeling (FEM), researchers have been able to evaluate the kinematic behavior of PF articulation in various disease settings and simulate morphological changes using patient-specific models. Suture tape augmentation of medial patellar stabilizers repair can be safely performed without an increase in contact. In summary, application of these advances to growing areas of inquiry studying PF disease has led to avenues of tremendous potential to improve our ability to accurately diagnose and treat patellofemoral disorders.

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*Department of Radiation Oncology*

Spicer A, Verhoef PA, Lopez-Espina C, Bhargava A, Schmalz L, **Sims M**, Palagiri AV, Lyer KV, Crisp MJ, **Halalau A**, **Maddens N**, Gosai F, Syed A, Azad S, **Espinosa A**, Reddy B, Sinha P and Churpek MM (2022). "Identifying novel subphenotypes in COVID-19 using protein biomarkers." American Journal of Respiratory and Critical Care Medicine 205: A3436.

[Full Text](#)

*Department of Internal Medicine/Infectious Disease*

*Department of Internal Medicine*

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*Department of Neurosurgery*

Tanniru M, Sule A and **Shajahan A** (2022). "Client centric view of population health in the digital age: Making healthcare personal." Frontiers in Public Health 10: 941423.

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*Department of Family Medicine and Community Health*

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[Full Text](#)

*Department of Foundational Medical Studies (OU)*

*OUWB Medical Student Author*

*Department of Diagnostic Radiology and Molecular Imaging*

**Tawfik AM**, Samra YA, Rajpurohit P, Elkalawozgy W and Zaidi Y (2022). "Role of Warburg effect in age-related macular degeneration." *Investigative Ophthalmology & Visual Science* 63(7): 465-A0002.

[Full Text](#)

*Department of Foundational Medical Studies (BH)*

**Taylor TAH, Kamel-ElSayed S, Grogan JF, Hajj Hussein I, Lerchenfeldt S and Mohiyeddini C** (2022).

"Teaching in uncertain times: Expanding the scope of extraneous cognitive load in the cognitive load theory." *Frontiers in Psychology*. ePub Ahead of Print.

[Full Text](#)

*Department of Foundational Medical Studies (OU)*

The COVID-19 pandemic caused an unprecedented and highly threatening, constrained, and confusing social and educational environment, we decided to expand the traditional focus of the extraneous load in Cognitive Load Theory (CLT) acknowledging the psychological environment in which learning occurs. We therefore adapted and implemented principles of the CLT to reduce extraneous load for our students by facilitating their educational activities. Given previous empirical support for the principles of CLT, it was expected that the adoption of these principles might enable our students to cultivate attitudes and skills across multiple domains such as online learning and presentation technologies, implementing and maintaining a "classroom atmosphere" in a virtual environment, participating in discussions among large online groups of students, facilitating group work, providing virtual office hours for students, and proactively planning for upcoming semesters.

Tong Y, Orang'o E, Nakalembe M, Tonui P, Itsura P, Muthoka K, Titus M, Kiptoo S, Mwangi A, Ong'echa J, Tonui R, Odongo B, Mpamani C, **Rosen B**, Moormann A, Cu-Uvin S, Bailey JA, Oduor CI, Ermel A, Yiannoutsos C, Musick B, Sang E, Ngeresa A, Banturaki G, Kiragga A, Zhang J, Song Y, Chintala S, Katzenellenbogen R, Loehrer P and Brown DR (2022). "The East Africa Consortium for Human Papillomavirus and Cervical Cancer in Women Living with HIV/AIDS." *Annals of Medicine*. ePub Ahead of Print.

[Full Text](#)

*Department of Obstetrics and Gynecology*

The East Africa Consortium was formed to study the epidemiology of human papillomavirus (HPV) infections and cervical cancer and the influence of human immunodeficiency virus (HIV) infection on HPV and cervical cancer, and to encourage collaborations between researchers in North America and East African countries. To date, studies have led to a better understanding of the influence of HIV infection on the detection and persistence of oncogenic HPV, the effects of dietary aflatoxin on the persistence of HPV, the benefits of antiretroviral therapy on HPV persistence, and the differences in HPV detections among HIV-infected and HIV-uninfected women undergoing treatment for cervical dysplasia by either cryotherapy or LEEP. It will now be determined how HPV testing fits into cervical cancer screening programs in Kenya and Uganda, how aflatoxin influences immunological control of HIV, how HPV alters certain genes involved in the growth of tumours in HIV-infected women. Although there have been challenges in performing this research, with time, this work should help to reduce the burden of cervical cancer and other cancers related to HIV infection in people living in sub-Saharan Africa, as well

as optimized processes to better facilitate research as well as patient autonomy and safety. KEY MESSAGE The East Africa Consortium was formed to study the epidemiology of human papillomavirus (HPV) infections and cervical cancer and the influence of human immunodeficiency virus (HIV) infection on HPV and cervical cancer. Collaborations have been established between researchers in North America and East African countries for these studies. Studies have led to a better understanding of the influence of HIV infection on the detection and persistence of oncogenic HPV, the effects of dietary aflatoxin on HPV detection, the benefits of antiretroviral therapy on HPV persistence, and the differences in HPV detections among HIV-infected and HIV-uninfected women undergoing treatment for cervical dysplasia by either cryotherapy or LEEP.

van Rosendaal AR, van den Hoogen IJ, Lin FY, Gianni U, Lu Y, Andreini D, Al-Mallah MH, Cademartiri F, **Chinnaiyan K**, Chow BJW, Conte E, Cury RC, Feuchtner G, de Araújo Gonçalves P, Hadamitzky M, Kim YJ, Leipsic JA, Maffei E, Marques H, Plank F, Pontone G, Raff GL, Villines TC, Lee SE, Al'Aref SJ, Baskaran L, Cho I, Danad I, Gransar H, Budoff MJ, Samady H, Virmani R, Min JK, Narula J, Berman DS, Chang HJ, Shaw LJ and Bax JJ (2022). "Age related compositional plaque burden by CT in patients with future ACS." Journal of Cardiovascular Computed Tomography. ePub Ahead of Print.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Background: We examined age differences in whole-heart volumes of non-calcified and calcified atherosclerosis by coronary computed tomography angiography (CCTA) of patients with future ACS. Methods: A total of 234 patients with core-lab adjudicated ACS after baseline CCTA were enrolled. Atherosclerotic plaque was quantified and characterized from the main epicardial vessels and side branches on a 0.5 mm cross-sectional basis. Calcified plaque and non-calcified plaque were defined by above or below 350 Hounsfield units. Patients were categorized according to their age by deciles. Also, coronary artery calcium scores (CACS) were evaluated when available. Results: Patients were on average  $62.2 \pm 11.5$  years old. On the pre-ACS CCTA, patients showed diffuse, multi-site, predominantly non-obstructive atherosclerosis across all age categories, with plaque being detected in 93.5% of all ACS cases. The proportion calcified plaque from the total plaque burden increased significantly with older presentation (10% calcification in those <50 years, and 50% calcification in those >80 years old). Patients with ACS <50 years had remarkably lower atherosclerotic burden compared with older patients, but a high proportion of high risk markers such as low-attenuation plaque. CACS was >0 in 85% of the patients older than 50 years, and in 57% of patients younger than 50 years. Conclusion: The proportion of calcified plaque varied depending on patient age at the time of ACS. Only a small proportion of plaque was calcified when ACS occurred at <50 years old, while this increased gradually with older age. Purely non-calcified atherosclerotic plaque was not uncommon in patients <50 years.

Verma A, Boersma L, Haines D, Natale A, Marchlinski F, Sanders P, Calkins H, Packer D, Hummel J, Onal B, Rosen S, Kuck KH, Hindricks G and Wilsmore B (2022). "First in human experience and acute procedural outcomes using a novel pulsed field ablation system: The pulsed AF pilot trial." Journal of Cardiovascular Electrophysiology 33(4): 778-779.

[Full Text](#)

*Department of Internal Medicine/Cardiovascular Disease*

Wadhvani S, Barrera AG, **Shifman H**, Baker E, Bucuvalas J, Gottlieb L, Kotagal U, Rhee S, Lai J and Lyles C (2022). "Caregiver perspectives on the everyday medical and social needs of long-term pediatric liver transplant patients." Liver Transplantation. ePub Ahead of Print.

[Full Text](#)

*OUWB Medical Student Author*

Using in-depth interviews, we sought to characterize the everyday medical and social needs of pediatric liver transplant caregivers to inform the future design of solutions to improve care processes. Participants (parents/caregivers of pediatric liver transplant recipients) completed a survey (assessing socioeconomic status, economic hardship, health literacy, and social isolation). We then asked participants to undergo a 60-min virtual, semistructured qualitative interview to understand the everyday medical and social needs of the caregiver and their household. We intentionally oversampled caregivers who reported a social or economic hardship on the survey. Transcripts were analyzed using thematic analysis and organized around the Capability, Opportunity, Motivation–Behavior model. A total of 18 caregivers participated. Of the participants, 50% reported some form of financial strain, and about half had less than 4 years of college education. Caregivers had high motivation and capability in executing transplant-related tasks but identified several opportunities for improving care. Caregivers perceived the health system to lack capability in identifying and intervening on specific family social needs. Caregiver interviews revealed multiple areas in which family supports could be strengthened, including (1) managing indirect costs of prolonged hospitalizations (e.g., food, parking), (2) communicating with employers to support families' needs, (3) coordinating care across hospital departments, and (4) clarifying care team roles in helping families reduce both medical and social barriers. This study highlights the caregiver perspective on barriers and facilitators to posttransplant care. Future work should identify whether these themes are present across transplant centers. Caregiver perspectives should help inform future interventions aimed at improving long-term outcomes for children after liver transplantation.

Willen BD, **Quinn TJ**, **Almahariq MF**, **Chen PY**, **Jawad MS**, **Gustafson GS**, Leung E, Wu MKY and **Dilworth JT** (2022). "Clinical outcomes of hypofractionated whole breast irradiation in early-stage, biologically high-risk breast cancer." *Practical Radiation Oncology*. ePub Ahead of Print.

[Full Text](#)

*Department of Radiation Oncology*

Purpose: Adoption of hypofractionated whole breast irradiation (WBI) for patients with early-stage, biologically high-risk breast cancer remains relatively low. We compared clinical outcomes of conventionally fractionated versus moderately hypofractionated WBI in this patient population. Methods: We queried a prospectively maintained database for patients with early-stage (T1-2, N0, M0) breast cancer who received whole breast irradiation with either conventional fractionation (CWBI) or moderate hypofractionation (HWBI) at a single institution. We included only patients with biologically high-risk tumors (defined as either ER/PR/HER-2 negative, HER-2 amplified, and/or patients with a high-risk multi-gene assay) who received systemic chemotherapy. Inverse probability of treatment weighting (IPTW) was used to compare treatment cohorts and to estimate 5-year time to event endpoints. Hazard ratios (HR) and 95% CI were determined based on Cox Proportional Hazards Model. Results: We identified 300 patients, of whom 171 received CWBI and 129 received HWBI. There was a statistically significant difference in median age at diagnosis, 59 years for CWBI vs 63 years for HWBI ( $p = 0.004$ ), and in median follow-up time, 97 months for CWBI vs 55 months for HWBI ( $p < 0.001$ ). After accounting for differences in patient and tumor characteristics with IPTW, we found similar 5-year freedom from local recurrence (HR 0.76, 95% CI 0.14-4.1), freedom from regional recurrence (HR 3.3, 95% CI 0.15-69), freedom from distant metastasis (HR 3.9, 95% CI 0.86-17), and disease-free survival (HR 0.84, 95% CI 0.3-2.4), between those treated with CWBI and those treated with HWBI. Results were similar among each of the three high-risk subtypes.

Conclusion: Our data support the use of moderately hypofractionated whole breast irradiation in patients with early-stage, biologically high-risk breast cancer.

Won KB, Lee BK, Heo R, Park HB, Lin FY, Hadamitzky M, Kim YJ, Sung JM, Conte E, Andreini D, Pontone G, Budoff MJ, Gottlieb I, Chun EJ, Cademartiri F, Maffei E, Marques H, de Araújo Gonçalves P, Leipsic JA, Lee SE, Shin S, Choi JH, Virmani R, Samady H, **Chinnaiyan K**, Berman DS, Narula J, Bax JJ, Min JK and Chang HJ (2022). "Longitudinal quantitative assessment of coronary atherosclerotic plaque burden related to serum hemoglobin levels." *JACC: Asia* 2(3P2): 311-319.

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*Department of Internal Medicine/Cardiovascular Disease*

Background: Despite a potential role of hemoglobin in atherosclerosis, data on coronary plaque volume changes (PVC) related to serum hemoglobin levels are limited. Objectives: The authors sought to evaluate coronary atherosclerotic plaque burden changes related to serum hemoglobin levels using serial coronary computed tomographic angiography (CCTA). Methods: A total of 830 subjects (age  $61 \pm 10$  years, 51.9% male) who underwent serial CCTA were analyzed. The median interscan period was 3.2 (IQR: 2.5-4.4) years. Quantitative assessment of coronary plaques was performed at both scans. All participants were stratified into 4 groups based on the quartile of baseline hemoglobin levels. Annualized total PVC (mm<sup>3</sup>/year) was defined as total PVC divided by the interscan period. Results: Baseline total plaque volume (mm<sup>3</sup>) was not different among all groups (group I [lowest]: 34.1 [IQR: 0.0-127.4] vs group II: 28.8 [IQR: 0.0-123.0] vs group III: 49.9 [IQR: 5.6-135.0] vs group IV [highest]: 34.3 [IQR: 0.0-130.7];  $P = 0.235$ ). During follow-up, serum hemoglobin level changes ( $\Delta$  hemoglobin; per 1 g/dL) was related to annualized total PVC ( $\beta = -0.114$ ) in overall participants ( $P < 0.05$ ). After adjusting for age, sex, traditional risk factors, baseline hemoglobin and creatinine levels, baseline total plaque volume, and the use of aspirin, beta-blocker, angiotensin-converting enzyme inhibitor or angiotensin receptor blocker, and statin,  $\Delta$  hemoglobin significantly affected annualized total PVC in only the composite of groups I and II ( $\beta = -2.401$ ;  $P = 0.004$ ). Conclusions: Serial CCTA findings suggest that  $\Delta$  hemoglobin has an independent effect on coronary atherosclerosis. This effect might be influenced by baseline hemoglobin levels.

Won KB, Park HB, Heo R, Lee BK, Lin FY, Hadamitzky M, Kim YJ, Sung JM, Conte E, Andreini D, Pontone G, Budoff MJ, Gottlieb I, Chun EJ, Cademartiri F, Maffei E, Marques H, Gonçalves PDA, Leipsic JA, Lee SE, Shin S, Choi JH, Virmani R, Samady H, **Chinnaiyan K**, Berman DS, Narula J, Bax JJ, Min JK and Chang HJ (2022). "Longitudinal quantitative assessment of coronary atherosclerosis related to normal systolic blood pressure maintenance in the absence of established cardiovascular disease." *Clinical Cardiology*. ePub Ahead of Print.

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*Department of Internal Medicine/Cardiovascular Disease*

Background: Atherosclerosis-related adverse events are commonly observed even in conditions with low cardiovascular (CV) risk. Longitudinal data regarding the association of normal systolic blood pressure maintenance (SBPmaintain) with coronary plaque volume changes (PVC) has been limited in adults without traditional CV disease. Hypothesis: Normal SBPmaintain is important to attenuate coronary atherosclerosis progression in adults without baseline CV disease. Methods: We analyzed 95 adults ( $56.7 \pm 8.5$  years; 40.0% men) without baseline CV disease who underwent serial coronary computed tomographic angiography with mean 3.5 years of follow-up. All participants were divided into two groups of normal SBPmaintain (follow-up SBP  $< 120$  mm Hg) and  $\geq$ elevated SBPmaintain (follow-up SBP  $\geq 120$  mm Hg). Annualized PVC was defined as PVC divided by the interscan period. Results: Compared to participants with

normal SBP maintain, those with  $\geq$  elevated SBP maintain had higher annualized total PVC (mm<sup>3</sup>/year) (0.0 [0.0–2.2] vs. 4.1 [0.0–13.0];  $p < .001$ ). Baseline total plaque volume ( $\beta = .10$ ) and the levels of SBP maintain ( $\beta = .23$ ) and follow-up high-density lipoprotein cholesterol ( $\beta = -0.28$ ) were associated with annualized total PVC (all  $p < .05$ ). The optimal cutoff of SBP maintain for predicting plaque progression was 118.5 mm Hg (sensitivity: 78.2%, specificity: 62.5%; area under curve: 0.700; 95% confidence interval [CI]: 0.59–0.81;  $p < .05$ ). SBP maintain  $\geq 118.5$  mm Hg (odds ratio [OR]: 4.03; 95% CI: 1.51–10.75) and baseline total plaque volume (OR: 1.03; 95% CI: 1.01–1.06) independently influenced coronary plaque progression (all  $p < .05$ ). Conclusion: Normal SBP maintain is substantial to attenuate coronary atherosclerosis progression in conditions without established CV disease.

Wuyckens S, Saint-Guillain M, Janssens G, Zhao L, **Li X**, **Ding X**, Sterpin E, Lee JA and Souris K (2022). "Treatment planning in arc proton therapy: Comparison of several optimization problem statements and their corresponding solvers." Computers in Biology and Medicine. ePub Ahead of Print.

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*Department of Radiation Oncology*

Arc proton therapy (ArcPT) is an emerging modality in cancer treatments. It delivers the proton beams following a sequence of irradiation angles while the gantry is continuously rotating around the patient. Compared to conventional proton treatments (intensity modulated proton therapy, IMPT), the number of beams is significantly increased bringing new degrees of freedom that leads to potentially better cancer care. However, the optimization of such treatment plans becomes more complex and several alternative statements of the problem can be considered and compared in order to solve the ArcPT problem. Three such problem statements, distinct in their mathematical formulation and properties, are investigated and applied to solving the ArcPT optimization problem. They make use of (i) fast iterative shrinkage-thresholding algorithm (FISTA), (ii) local search (LS) and (iii) mixed-integer programming (MIP). The treatment plans obtained with those methods are compared among them, but also with IMPT and an existing state-of-the-art method: Spot-Scanning Proton Arc (SPArc). MIP stands out at low scale problems both in terms of dose quality and time delivery efficiency. FISTA shows high dose quality but experiences difficulty to optimize the energy sequence while LS is mostly the antagonist. This detailed study describes independent approaches to solve the ArcPT problem and depending on the clinical case, one should be cautiously picked rather than the other. This paper gives the first formal definition of the problem at stake, as well as a first reference benchmark. Finally, empirical conclusions are drawn, based on realistic assumptions.

Yilmaz S, Grudzen CR, Durham DD, McNaughton C, Marcelin I, Abar B, Adler D, **Bastani A**, Baugh CW, Bernstein SL, Bischof JJ, Coyne CJ, Henning DJ, Hudson MF, Klotz A, Lyman GH, Madsen TE, Pallin DJ, Reyes-Gibby C, Rico JF, Ryan RJ, Shapiro NI, **Swor R**, Thomas CR, Venkat A, Wilson J, Yeung SCJ and Caterino JM (2022). "Palliative care needs and clinical outcomes of patients with advanced cancer in the emergency department." Journal of Palliative Medicine. ePub Ahead of Print.

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*Department of Emergency Medicine*

Zhao L, Liu G, **Li X** and **Ding X** (2022). "An evolutionary algorithm of the spot sparsity optimization in proton arc therapy." Medical Physics 49(6): E209-E209.

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*Department of Radiation Oncology*

Zhao L, Liu G, **Qin A, Yan D, Stevens C, Li X, Deraniyagala R and Ding X** (2022). "Feasibility of utilizing Spot-scanning Proton ARC (SPARC) therapy for whole lung irradiation." Radiotherapy and Oncology 170: S1448-S1449.

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*Department of Radiation Oncology*

Zhao L, Liu G, Zheng W, Shen J, Lee A, **Yan D, Deraniyagala R, Stevens C, Li X, Tang S and Ding X** (2022). "Building a precise machine-specific time structure of the spot and energy delivery model for a cyclotron-based proton therapy system." Physics in Medicine and Biology 67(1): 01NT01.

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*Department of Radiation Oncology*

Objective: We proposed an experimental approach to build a precise machine-specific beam delivery time (BDT) prediction and delivery sequence model for standard, volumetric, and layer repainting delivery based on a cyclotron accelerator system. Approach: Test fields and clinical treatment plans' log files were used to experimentally derive three main beam delivery parameters that impacted BDT: energy layer switching time (ELST), spot switching time, and spot drill time. This derived machine-specific model includes standard, volumetric, and layer repainting delivery sequences. A total of 103 clinical treatment fields were used to validate the model. Main results: The study found that ELST is not stochastic in this specific machine. Instead, it is actually the data transmission time or energy selection time, whichever takes longer. The validation showed that the accuracy of each component of the BDT matches well between machine log files and the model's prediction. The average total BDT was about  $(-0.74 \pm 3.33)\%$  difference compared to the actual treatment log files, which is improved from the current commercial proton therapy system's prediction ( $67.22\% \pm 26.19\%$ ). Significance: An accurate BDT prediction and delivery sequence model was established for an cyclotron-based proton therapy system IBA ProteusPLUS®. Most institutions could adopt this method to build a machine-specific model for their own proton system.

Zhao L, You J, Liu G, Lu X and **Ding X** (2022). "A novel simultaneous plan quality and beam delivery time SPARC optimization platform using primal dual active set with continuation (PDASC)." Medical Physics 49(6): E116-E116.

[Full Text](#)

*Department of Radiation Oncology*

Zhao LW, Liu G, Chen SP, Shen JJ, Zheng WL, **Qin A, Yan D, Li XQ and Ding XF** (2022). "Developing an accurate model of spot-scanning treatment delivery time and sequence for a compact superconducting synchrocyclotron proton therapy system." Radiation Oncology 17(1): 87.

[Full Text](#)

*Department of Radiation Oncology*

Zureick AH, Grzywacz VP, **Almahariq MF, Silverman BR, Vayntraub A, Chen PY, Gustafson GS, Jawad MS and Dilworth JT** (2022). "Dose to the left anterior descending artery correlates with cardiac events after irradiation for breast cancer." International Journal of Radiation Oncology Biology Physics. ePub Ahead of Print.

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*Department of Radiation Oncology*

Purpose: Although global heart dose has been associated with late cardiac toxic effects in patients who received radiation therapy for breast cancer, data detailing the clinical significance

of cardiac substructure dosimetry are limited. We investigated whether dose to the left anterior descending artery (LAD) correlates with adverse cardiac events. **Methods and Materials:** We identified 375 consecutively treated female patients from 2012 to 2018 who received left-sided breast or chest wall irradiation (with or without regional nodal irradiation). Medical records were queried to identify cardiac events after radiation therapy. Mean and maximum LAD and heart doses (LAD Dmean, LAD Dmax, heart Dmean, and heart Dmax) were calculated and converted to 2-Gy equivalent doses (EQD2). Univariate and multivariable Cox regression analyses were performed to determine association with cardiac toxic effects. Potential dose thresholds for each of the 4 dose parameters were identified by receiver operating characteristic (ROC) curve analysis, after which Kaplan-Meier analysis was performed to compare cardiac event-free survival based on these constraints. **Results:** Median follow-up time was 48 months. Thirty-six patients experienced a cardiac event, and 23 patients experienced a major cardiac event. On univariate and multivariable analyses, increased LAD Dmean, LAD Dmax, and heart Dmean were associated with increased risk of any cardiac event and a major cardiac event. ROC curve analysis identified a threshold LAD Dmean EQD2 of 2.8 Gy (area under the ROC curve, 0.69), above which the risk for any cardiac event was higher ( $P = .001$ ). Similar results were seen when stratifying by LAD Dmax EQD2 of 6.7 Gy ( $P = .005$ ) and heart Dmean EQD2 of 0.8 Gy ( $P = .01$ ). **Conclusions:** Dose to the LAD correlated with adverse cardiac events in this cohort. Contouring and minimizing dose to the LAD should be considered for patients receiving radiation therapy for left-sided breast cancer.