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Treatment Outcome Preferences: Priorities of Patients with Hematologic Malignancies

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Background: A clear understanding of cancer patients' preferences is necessary to guide clinical decision-making.¹ We sought to quantify the priorities of treatment outcomes and risk-benefit tradeoffs of adults >60 years old, newly diagnosed with hematologic malignancies.

Methods: Patients completed a series of choice tasks through a Best Worst Scaling (BWS) measure previously developed and validated to choose treatment priorities prior to initial treatment decisions and longitudinally each month.^{2,3} Along with the BWS, direct elicitation was used to determine risk-benefit tolerance.

Results: The ranked importance of priorities for the entire cohort (n=25) was 1) Maintaining day-to-day activities (standardized best minus worst, 23.8), 2) Living longer (12.4), 3) Avoiding becoming more dependent on others (7.9), 4) Avoiding hospitalizations (2.2), 5) Avoiding long-term effects (-5.2), 6) Avoiding short-term effects (-19.5), and 7) Avoiding high financial costs (-21.5). On subsequent surveys, 69% changed their most important attribute at least once. Patients were willing to accept hospital stays of 1 week (88%), 1 month (58%), and 3 months (25%) in exchange for 6 additional months of life. 25% of patients would accept full-time caregiving in exchange for living 2 years longer, whereas 79% of patients would accept part-time caregiving for 6 additional months. Some patients were unwilling to accept this additional time if it meant requiring assistance dressing (33%) or bathing (54%). In exchange for 6 additional months of life, patients were willing to spend \$250 (83%), \$500 (58%), or \$1000 (42%) per month.

Conclusion: Maintaining function is highly valued for many cancer patients, frequently more than prolonging survival.

Importance: Patients widely differ in prioritizing outcomes and change over time, highlighting the need to elicit individual priorities at each significant treatment decision.

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Long-term outcomes of Ventral Hernia Repair Using a New Prosthetic Mesh

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Background: Synecor[®] (W.L. Gore and Associates, Flagstaff, AZ) is a new permanent synthetic mesh made of a combination of an absorbable synthetic component and a permanent synthetic component that can be used intraperitoneally or within the abdominal wall layers. Currently, there are little data on long-term outcomes related to this mesh product. The purpose of this project is to review our medical center's outcomes using Synecor mesh in ventral hernia repair.

Methods: We retrospectively reviewed all patients at our single medical center undergoing ventral hernia repair using Synecor[®] mesh included in the Americas Hernia Society Quality Collaborative (AHSQC) database from April 2016 through September 2019. Demographic, perioperative, and short and long-term outcomes (surgical site infection [SSI], surgical site occurrence [SSO], surgical site occurrence requiring procedural intervention [SSOPI]), reoperation, and recurrence rates were reviewed, and descriptive statistics were calculated. Patients were divided based on the use of the preperitoneal and intraperitoneal mesh.

Results: A total of forty-eight patients who underwent ventral hernia repairs using Synecor mesh met study inclusion criteria. Preperitoneal mesh was used in 19 patients with an average age of 58 years (range 42-77 years) and 68% Caucasian. At least 1 comorbidity was present in 74%. Type of surgery included 14 patients undergoing open hernia repair, 3 undergoing laparoscopic converted to open and 2 patients undergoing robotic repair. Retrorectus repair was performed in 13 patients and 5 patients underwent TAR. Outcomes included 30-day complications occurred in 5 patients (26.3%), readmission in 1 patient (5.3%), and reoperation in 3 patients (15.8%). At an average follow up of 2.3 years hernia recurrences occurred in 2 patients (10.5%). Intraperitoneal mesh was used in 29 patients with an average age of 59 years (range 34-78 years) with 62% female, and 86% Caucasian. At least 1 comorbidity was present in 21 patients. Outcomes included 30-day complication in 9 patients (31%), readmission in 5 patients (17.2%), and reoperation in 6 patients (20.7%). At an average follow-up of 3.1 years hernia recurrence was noted in 1 patient (3.4%).

Conclusion: Synecor mesh is a new synthetic mesh that can be used for ventral hernia repair in an open, laparoscopic, or robotic approach. Long-term results show low recurrence rates with complication and reoperation rates similar to previous studies.

Importance: This retrospective review and subsequent analysis provides a comprehensive review of short and long-term outcomes for a new mesh variety. This framework could be applied in the future as new meshes enter the market and surgeons are interested to see if the mesh performs as well or better as other standard meshes.

Cruel and Unusual Punishment? The Influence of State Level Variables on Medication for Opioid Use Disorder in Prisons in the United States

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Background: Opioid use disorder (OUD) has continued to rise in the US, contributing to mortality and morbidity for those recently incarcerated. Major medical associations recommend the use of medication treatment for opioid use disorder (MOUD) in prisons to improve health outcomes for the incarcerated population. However, many prisons across the US do not provide MOUD. This research explores state level variables that contribute to the quality of MOUD in US prisons.

Methods: I constructed an analyzable database using publicly available policy data to understand the likelihood that any given state will have a MOUD program in its prisons. I then drew comparisons between the relationships of these variables and the quality of MOUD programs measured by a calculated score that accounts for presence of a program and the types of medications it provides using linear regression.

Results: I collected data from 50 states and Washington DC and found a mean total scale of 3.41. I ran three separate policy regressions and one demographic regression to explore the relationship between variables. In all three policy regressions, number of syringe exchange programs and total number of years of Medicaid expansion were statistically significantly associated with total score. In the demographic regression, number of prisoners was significantly associated with total scale.

Conclusion: Considerable variation in the accessibility of MOUD in prisons in the US exists. There remains a need for a national database of information about MOUD in programs in prisons across the US so that such programs can be studied and compared.

Importance: As far as I am aware, this is the first study to attempt to draw state level comparisons on MOUD in prisons in the United States. This study provides insight into differences between state MOUD programs and draws comparisons between state level political and demographic variables that may contribute to our understanding of where and how the presence and quality of MOUD programs may vary. This analysis revealed that there is considerable variation in the accessibility of MOUD in prisons in the United States.

Characterizing Missed Opportunities to Reduce Inappropriate Aspirin Use: A Pilot Study

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Background: Aspirin is one of the most widely used medications in the world and has historically been used for both prevention and treatment of multiple cardiovascular diseases. Recently, however, three large and high-quality trials have indicated that the risk of chronic aspirin use may outweigh benefits in certain older adults. The present study was aimed at characterizing the counsel, or lack thereof, that patients presenting to the emergency department with bleeding events are receiving on their aspirin use. We additionally gathered data on frequency of inappropriate aspirin use and rates of aspirin discontinuation post-bleeding to contextualize this counsel.

Methods: We prospectively observed the current state of risk-benefit counseling through standardized telephone interviews with patients approximately 14 and 28 days after their bleeding-related visit at one of two UNC-affiliated emergency departments.

Results: The data from twelve interviews showed that though 83% of patients followed up with a medical provider within the first 20 days after their bleeding event, only 42% had conversations about aspirin and only 25% had conversations specifically about the risks and benefits of aspirin use. A different 25% of patients stopped using aspirin within the first 40 days after their bleeding. 50% of patients also were using aspirin without clear indication.

Conclusion: This preliminary data provides evidence for our hypothesis that older adults are often not receiving risk-benefit counsel on aspirin use after a bleeding-related emergency department visit. This data could also indicate that providers are infrequently reevaluating medications and/or considering deprescription after potential adverse drug events.

Importance: Future expansion of this study will help further characterize missed opportunities for aspirin deprescription after a potential adverse drug event. Iteration of these assessments

will also rationalize and inform development of a deprescription intervention to be used in emergency departments when applicable.

Initiation of a Multidisciplinary Cardiac Care Team, Patient Characteristics and Pregnancy Outcomes

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Background: Cardiac conditions in pregnancy are associated with significant maternal mortality. Optimizing management of these patients should be a priority to improve patient outcomes.

Methods: This was a retrospective cohort study from October 1, 2021, and July 31, 2023. This study included all pregnancies managed by a newly formed single-center, multidisciplinary cardiac care team. Patient data were obtained by retrospective record review. Demographics, cardiac lesion characteristics, and pregnancy outcomes were recorded.

Results: A total of 46 pregnant patients were managed by a multidisciplinary cardiac care team. Among them, 11 patients (23.9%) had congenital cardiac lesions, 20 patients (43.5%) had arrhythmias, 12 (26.1%) had cardiomyopathies, and 19 (41.3%) had vascular disease. The majority of the cardiac lesions (43, 93.5%) were diagnosed before pregnancy, and almost two-thirds of the patients (29, 62.8%) were classified as modified WHO class II. Three (6.5%) underwent termination of pregnancy, 21 (48.8%) had cesarean deliveries, and two (4.7%) had operative vaginal deliveries. The median gestational age at delivery was 37 weeks. Eight pregnant patients (17.3%) required ICU admission, and one participant (2.2%) needed ECMO cannulation.

Conclusion: Further research is necessary to determine whether the standardized approach of a multidisciplinary cardiac care team improves maternal outcomes for patients with cardiac diseases.

Importance: Ongoing process improvement in the management of these patients is crucial in order to improve patient outcomes and reduce maternal mortality.

Electromyographic Findings in Macromastia Patients

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Background: Macromastia, affecting 1-5% of women, is often associated with chronic musculoskeletal pain due to biomechanical alterations in the spine. This condition shifts the center of gravity, leading to cervical lordosis and coracoid process anterior tilt, subsequently narrowing the thoracic outlet. The added anterior chest load exacerbates thoracic kyphosis and cervical lordosis, contributing to shoulder and head protraction. There is minimal literature characterizing the symptomatology of macromastia with modalities such as electromyography (EMG). Two studies have used surface EMG to assess the effect of increasing breast size on postural muscles including lumbar erector spinae, rectus abdominus, oblique muscles and other neck and trunk muscles during everyday movements. The goal of this study is to analyze trends in EMG findings among women with macromastia and specifically determine if there is a relationship between macromastia and spinal radiculopathy.

Methods: This retrospective study included female patients ages 14-75 with an ICD9/10 diagnosis of breast hypertrophy or underwent a reduction mammoplasty who also received an EMG study during 4/1/2014 and 1/1/2022. Patients with the following characteristics were excluded: patients with history of spinal surgery or spinal pathology, history of mastectomy, musculoskeletal asymmetries, or musculoskeletal disorders.

Results: Based on prior literature, we hypothesized that patients with macromastia will have spinal radiculopathy on EMG studies. There were 97 patients who met inclusion criteria. The most common finding on EMG was median nerve neuropathy (55.7%) followed by radiculopathy (20.6%), ulnar nerve neuropathy (15.5%) and other conditions like plexopathies (9.3%). Around a quarter of patients (25.8%) had a normal EMG. Out of the 97 patients, 31 underwent a reduction mammoplasty.

Conclusion: This study underscores the possibility that macromastia-induced alterations in upper trunk posture and biomechanics may contribute to spinal radiculopathy and various musculoskeletal anomalies over time.

Importance: The importance of this study lies in its potential to shed light on the underexplored relationship between macromastia, altered upper trunk posture, and the development of spinal radiculopathy, offering valuable insights into the musculoskeletal implications of this condition.

Psychosis-Related Post-Traumatic Stress: A Case Report in a Young Active-Duty Servicemember

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Background: While the link between traumatic stress precipitating the onset or exacerbation of psychosis is well-studied, there also exists evidence of the reverse phenomenon – psychotic episodes acting as traumatic events that may precipitate post-traumatic stress symptoms. Here, we present a case of first-episode psychosis in an active-duty service member, resulting in psychosis-related posttraumatic stress symptoms.

Methods: A single case report and brief literature review of psychosis-related PTSD.

Case Report: The patient is a 22-year-old African-American male active duty lance-corporal with no prior psychiatric history who presented with first episode psychosis requiring medical evacuation to our facility. Primary symptoms included auditory hallucinations, paranoia, and delusions of persecution. He was stabilized on risperidone 5mg daily and discharged to our first episode psychosis program. Over the course of several months with our program, his symptoms of psychosis remained in full remission. However, he continued to complain of persistent anxiety, insomnia, hypervigilance, and rumination on his psychotic break, with associated nightmares and flashbacks related to the trauma of his psychotic episode, suggesting a PTSD-like phenomenon.

Conclusion: This case demonstrates traumatic symptoms resulting from a first episode of psychosis well after positive symptoms were controlled. Cases of psychosis-related PTSD have previously been documented in adolescent males with schizophrenia who developed symptoms including re-experiencing the event, avoidance, and hyperarousal in response to psychotic episodes^{1,2}. Prevalence of psychosis-related PTSD is documented from 11-67%³⁻⁵. Psychosis can be conceptualized as traumatic as both a life-altering event and oftentimes associated with a strong perception of threat to life. Factors associated with developing PTSD symptoms following a psychotic event include childhood trauma, individual coping styles, hopelessness regarding illness, and low perceived social support^{3,4}.

Importance: PTSD symptoms related to psychosis may impede recovery from a psychotic episode, impact adherence to medications and trust in the care team, and increase the risk for substance use. Limited information exists regarding treatment considerations for psychosis-related PTSD, though some evidence suggests trauma-focused CBT may be effective⁶. Further research is needed on the phenomenology of psychosis-related PTSD, risk factors associated with its development, and treatment considerations.

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Understanding the Effects of Maternal Care Unit Closures on Emergency Department Utilization Among Pregnant Individuals in North Carolina

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Background: Rural maternity units in North Carolina (NC) closures impact the ability of pregnant patients to seek care. Patients may turn to the Emergency Department (ED) when faced with lack of access to appropriate maternal care. This study investigates how maternity care unit closures in rural counties from 2016-2021 affect the number of ED pregnancy-associated visits in affected counties and the distribution of these visits by race/ethnicity compared with NC census data.

Methods: We utilized data collected by the North Carolina Disease Event Tracking and Epidemiologic Collection Tool to examine ED visits for women of reproductive age residing in counties with maternity unit closures between 01/01/2016-12/31/2021. We used data available through the University of North Carolina Cecil G. Sheps Center to determine which counties were affected by closure of a maternity unit.

Results: Preliminary data shows that the number of ED visits for pregnancy-associated and/or-related diagnoses codes for patients from counties affected by a maternity unit closure significantly increased ($p < 0.001$) compared to visits pre-closure. Additionally, these data suggest maternity unit closures disproportionately affect Black/African American, American Indian, and Hispanic patients as the proportion of pregnancy-related ED visits for these groups were significantly higher than other racial and ethnic groups ($p < 0.001$).

Conclusion: Counties that experienced maternity ward closures between 01/01/2016 and 12/31/2021 had a significantly higher number of pregnancy-related ED visits prior to unit closures. Patients of Black/African American, American Indian, and Hispanic racial or ethnic backgrounds were disproportionately affected by these closures.

Importance: These data demonstrate the impact of maternity unit closures in six different rural counties of NC. With increasing maternal morbidity and mortality, it is vital to understand how these closures impact the care pregnant patients in affected counties receive and identify how we can address and improve their access to necessary medical treatment.

Decreasing Fall Risk in Older Adult Patients by Deprescribing Medications Included in 2019 American Geriatrics Society (AGS) Beers Criteria

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Background: Falls in adults over the age of 65 are associated with high morbidity and mortality and cost the US healthcare system over 50 billion dollars each year¹. About 1 in 3 individuals over the age of 65 will fall each year, with history of falls and medication side effects among top risk factors¹. AGS published the 2019 Beers Criteria of Potentially Inappropriate Medications (PIMs) to avoid use in older adults to lower health risks, including falls². The objective of this study is to decrease fall risk in older adult patients by deprescribing PIMs included in Beers Criteria.

Methods: A quality improvement project was performed in an outpatient Internal Medicine resident clinic among 40 patients, ages 65-75, with history of falls in the past year and PIM prescriptions. A third-year medical student performed chart review and implemented 3 sequential strategies to deprescribe PIMs. The interventions included letters to providers for patients seen in the past 3 months (retrospective), staff messages to providers via Electronic Medical Record for patients scheduled that week (prospective), and patient counseling at appointments (real-time). Number of PIMs deprescribed were tracked during the interventions to determine the most effective strategy.

Results: The retrospective, prospective, and real-time interventions yielded 9.5%, 21%, and 25% decreases in PIM prescriptions, respectively. Real-time intervention was most effective in deprescribing PIMs.

Conclusion: An intervention including patient education on Beers Criteria medications' side effects during appointments can be effective in outpatient clinical settings to decrease PIM prescriptions, which could reduce fall risk in older adult patients. The current project serves as a pilot study for best practices of deprescribing PIMs in older adult patients, with a study of greater magnitude and duration necessary to draw more significant conclusions.

Importance: As concluded in this study, further research in best practices of deprescribing PIMs is important to lower health risks of polypharmacy in older adults.

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Residual Gastric Contents in Appropriately Fasted Patients on GLP-1 Agonists

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Background: Glucagon-like peptide-1 receptor (GLP1) agonists have been increasingly prescribed to aid in weight loss and glycemic control, with the potential side effect of slowed gastric emptying, which may increase risk of regurgitation and aspiration. The incidence of retained gastric contents (RGC) in the general population during upper gastrointestinal (UGI) endoscopy has been cited to be 3-5%.^{1,2} Our aim was to investigate the incidence of RGC among appropriately fasted patients on a GLP1 agonist presenting for UGI endoscopy.

Methods: A retrospective chart review of patients undergoing UGI endoscopy was conducted. Included were patients aged 14 years or older who had been taking a GLP1 agonist for at least one month prior to the procedure, adhered to standard fasting guidelines, and had clear documentation in the electronic medical record of gastric findings during endoscopy. Primary outcome was the incidence of RGC. Secondary outcomes included the incidence of RGC among those with a history of diabetes mellitus (DM) and those with previous gastric surgery compared to those without.

Results: From July 2022 to May 2023, 267 patients (median age = 58, median BMI = 34) were included. RGC were found in 35/267 (13%) patients. There was no difference in rates of diabetes mellitus (DM) or rates of previous gastric surgery between those with and without RGC. Female patients were less likely to have RGC ($p = 0.047$).

Conclusion: A high incidence of RGC was found in appropriately fasted patients on a GLP1 agonist. Anesthesiologists should remain vigilant regarding a potential increased risk of RGC in appropriately fasted patients on a GLP1 agonist who present for surgery.

Importance: With a growing number of patients on GLP1 agonists and more evidence for RGC, anesthesiologists must take extra precautions to mitigate the risk of aspiration, such as implementing an extended fasting period, utilizing preoperative ultrasound assessment of RGC, prescribing prokinetic medications, and halting the use of GLP1 agonists prior to the procedure.

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Is there a global disparity in our backyard? Cervical Cancer Screening among foreign-born women at Urban Ministries Open Door Clinic

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Background: Ethnic minority communities and immigrant populations in the US experience disparate health outcomes compared to the general population.¹ This research aims to investigate potential disparities in cervical cancer screening history based on ethnicity and birthplace at Urban Ministries of Wake County, Open Door Clinic (ODC). The study seeks to contribute to existing knowledge about the relationship between cervical cancer screening and ethnicity/birthplace to inform targeted outreach programs for immigrant and refugee populations.

Methods: This retrospective cohort study examined the relationship between ethnicity/birthplace and cervical cancer screening history at Urban Ministries Open Door Clinic. Statistical analysis included univariate and multivariate logistic regression models to calculate odds ratios (ORs) for cervical cancer screening among foreign-born compared to US-born patients.

Results: The study included 1,276 eligible female patients aged 21-99, with 54.8% identified as foreign-born. Among the patients, 47.7% had ever received a Pap smear, with 82.3% of screened patients being foreign-born. In the multivariate analysis, being foreign-born was associated with a significantly higher odds ratio (OR) of 68.10 (95% CI 9.94-466.60) for having ever had cervical cancer screening.

Conclusion: Cervical cancer screening is crucial for sexual and reproductive health, particularly among vulnerable populations like immigrants and refugees. This study found that foreign-born patients at Open Door Clinic were more likely to receive cervical cancer screening, indicating the potential effectiveness of integrated services for immigrant populations. Further research is needed to establish the association between these services and screening outcomes and promote their implementation to address cervical cancer screening disparities among immigrants.

Importance: Contrary to previous literature, foreign-born patients at Open Door Clinic had higher odds of receiving cervical cancer screening, possibly due to clinic initiatives such as bilingual services and patient outreach. However, the findings also suggest a potential gap in care for non-foreign-born patients. Future research should explore service effectiveness and consider additional variables to improve accuracy while protecting patient privacy. These findings have implications for developing clinical models addressing disparities in cervical cancer screening among immigrant populations.

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Prevalence of Drug-Drug Interactions That Elevate Bleeding Risk in Older Adults Presenting with Falls

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Background: Patients at high risk of falls are often advised to stop using antiplatelet or anticoagulation medications due to concern for bleeding. Such risk could also be mitigated by reducing drug-drug interactions (DDIs) that increase bleeding risk in patients at risk of falls, though there is limited research on such DDIs. Our objectives were to determine the prevalence of DDIs that increase bleeding risk in a cohort of patients presenting with a fall and to identify common pairs of such interacting drugs.

Methods: We performed a cross sectional analysis of data collected from a pharmacist-led fall-prevention program focused on older adults presenting with a fall to an academic ED in the southeastern United States between August 2020 – December 2021. Pharmacists performed medication reconciliations on older adults (≥ 65 years old) presenting with a chief complaint of ‘fall’ to obtain data on outpatient prescription drug use. DDIs that are known to increase bleeding risk were identified in accordance with the 2021 Choosing Wisely & American Society of Consultant Pharmacists guidelines. Such medications include direct oral anticoagulants (DOACs), warfarin, aspirin, selective serotonin reuptake inhibitors (SSRIs), antiplatelet agents, nonsteroidal anti-inflammatory drugs (NSAIDs), and corticosteroids.

Results: Among 514 patients presenting with a fall to the ED, 171 were prescribed an anticoagulant or antiplatelet medication, 67.3% were women and the mean age was 81.2 years. Among patients on an anticoagulant or antiplatelet medication, 39.7% (68/171; 95% CI: 32.7-47.3%) had potentially harmful DDIs that increased the likelihood of bleeding per 2021 Choosing Wisely guidelines. The most identified DDIs included: concomitant use of aspirin

and SSRIs (44/171; 25.7%, 95% CI: 19.7-32.9%), SSRIs and DOACs (13/171; 7.7%, 95% CI: 4.4-12.7%), aspirin and P2Y₁₂ inhibitors (11/171; 6.4%, 95% CI: 3.6-11.2%) and aspirin and DOACs (6/171; 3.5%, 95% CI: 1.6-7.6%).

Conclusion: Four in ten older adults who presented with a fall and were actively using either anticoagulant or antiplatelet agents were found to have DDIs that increase bleeding risk.

Importance: Patients on an anticoagulant or antiplatelet medication who present to the ED with a fall may benefit from interventions to screen for DDIs and potentially discontinue those that increase bleeding risk in this vulnerable subpopulation.

Mesoporous melanin-like nanoparticles as antioxidant and drug-delivery carriers for the treatment of AMD

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Background: Age-related macular degeneration (AMD) is the leading cause of central vision loss. As current treatments for AMD have limited efficacy and require significant patient compliance, the development of effective therapeutic agents for AMD remains greatly needed. Melanin is found in the skin and retinal pigment epithelium (RPE), where it is thought to function as a photoprotective agent, free radical scavenger, and metal cation binding reservoir. Melanin in the RPE cannot be regenerated, and the quantity and antioxidative functions of RPE melanin diminish with age. Previously, we investigated the impact of melanin on AMD using water-soluble melanin-like nanoparticles (MNPs). This study aims to determine the efficacy of mesoporous MNPs (mMNPs), renowned for their increased interior pores, as an antioxidative and drug-delivery agent for the treatment of AMD.

Methods: mMNPs were synthesized via the self-assembly of F127/TMB/polydopamine. The shape, size, and surface charge of mMNPs were characterized using TEM and DLS. mMNP antioxidative activity for intracellular ROS and cell cytotoxicity was assessed by DCFDA and CCK8 assays. The therapeutic effect of mMNPs was assessed using a blue light-induced photodamage murine model, and OCT, fundus, and immunocytochemistry analyses were performed.

Results: TEM images showed mMNPs of approximately 150 nm in size with a pore diameter of 11 nm. The particles demonstrated strong antioxidative activity against intracellular ROS. Notably, mMNPs can accumulate in the cytoplasm of RPE cells without nuclear entry. The cell viability of mMNP-treated RPE cells was above 80 % at concentrations under 100 ug/ml, indicating they are safe and well-tolerated. Fundus and OCT images revealed retinal photodamage following blue light exposure. Additionally, intravitreal injection of mMNPs attenuated ROS levels and inflammation.

Conclusions: mMNPs can exert antioxidative effects, which can alleviate oxidative stress within the RPE that contributes to AMD development. Additionally, mMNPs could serve as a potential drug-delivery agent of anti-inflammatory drugs to the RPE for the treatment of AMD.

Importance: Due to their anti-oxidative and drug-delivery capabilities, an intravitreal injection of mMNPs represents a promising new avenue of treatment for AMD.

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Gender Differences in Self-Description: A Linguistic Analysis of Orthopaedic Surgery Residency Application Personal Statements

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Background: Women are consistently underrepresented in orthopaedic surgery when compared to other surgical subspecialties. The shortage of women in orthopaedics is likely multifactorial, and key drivers have not been established. The personal statement is an essential part of the residency application, where applicants articulate their unique story to highlight the qualities and skills they possess. The purpose of this study is to assess differences in language characteristics in personal statements written by male and female applicants to an orthopaedic surgery residency program.

Methods: Personal statements from applicants to an orthopaedic surgery residency training program were collected. Language characteristics of 889 eligible personal statements were analyzed via internally and externally validated linguistic analysis software. This software evaluated 19 variables, including word count, 4 summary language variables (analytical thinking, clarity, authenticity, and emotional tone), and 14 additional word categories. Demographic data for each applicant was recorded, and results were stratified by gender, controlling for ethnicity and Step 1 score. Results with a $p < 0.05$ were considered statistically significant.

Results: Word count was not statistically significant between groups. Amongst the summary language variables, authenticity was higher in female applicants ($p = 0.0142$). Of the selected word categories, males averaged a higher score in certainty ($p = 0.0418$), while females averaged higher scores in curiosity ($p = 0.0102$), perception ($p = 0.0486$), and attention ($p = 0.0293$).

Conclusion: Statistically significant differences exist in the language characteristics of personal statements written by male and female applicants. Specific language characteristics may affect an applicant's competitiveness for an orthopaedic surgery residency program. Consequently, assessing how program directors value or perceive certain language characteristics could further explain the persistent gap between the number of female and male orthopedic surgeons.

Importance: To date, no studies have analyzed the gender-based linguistic differences in orthopaedic surgery residency applicants' personal statements. This topic is crucial given the gender disparity among orthopaedic surgery residency programs and the specialty as a whole.

Tumor characteristics and event-free survival in older and younger women with early breast cancer

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Background: Age, menopausal status, body mass index (BMI), breast density, race, parity, health behaviors, tumor characteristics, and treatment regimen are associated with breast cancer (BC) risk. This study analyzes associations of these risk factors and 5-year event-free survival (EFS) in patients aged 65 or older as compared to those under age 65.

Methods: Events included BC recurrence, second primary tumor, metastases, and survival. Patients were stratified by age for analysis, and outcomes were censored at 5 years post-chemo. Survival was estimated using the Kaplan-Meier method and compared using a Cox proportional hazard model.

Results: In a sample of 731 women treated with chemotherapy for early BC, mean age at diagnosis was 53 years (78% age <65, 22% age 65 or older, 75% White, 23% Black). BC stage among women <65 was I (15%), II (54%) or III (31%) and for women aged 65 or older stage I (28%), II (48%), or III (25%) ($p=.0007$). Younger women had larger tumor size (3.3 vs 2.7) ($p=.0005$) and higher breast density ($p=.01$). For 27 events in women <65, significant variables for EFS were tumor subtype ($p=.05$) and triple negative status ($p=.01$). For 19 events among women 65 or older, significant EFS variables were tumor subtype ($p=.03$), triple negative status ($p=.008$), and receipt of radiation treatment ($p=.002$).

Conclusions: In our sample, there were no significant survival differences by race, BMI, smoking history, alcohol use, parity, T or N stage, positive test for genetic marker, nodal status, breast density, or type of chemotherapy regimen.

Importance: In other studies that included women of a similar age range, only triple negative status was shown to have a significant predictive relationship to EFS. Additionally, this study corroborated similar inconclusive findings regarding the relationship between high BMI and cancer recurrence.

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Synthesis, Characterization, and Cell Culture Applications of Aminoacrylate Hydrogels

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Background: Hydrogels are widely used within the biomedical sciences due to their chemical stability, structural resilience, and non-toxic nature. These water-swollen cross-linked polymer networks can be engineered from the bottom up for various biomedical applications including wound healing, drug delivery, and tissue engineering. Despite their versatility, the utility of hydrogels can be limited by inefficient scalability, expensive materials, and suboptimal post-polymerization modifications. In this study, our goal was to address these limitations by synthesizing a new synthetic hydrogel that is easily scalable and operationally-simple. We accomplished this goal by forming an aminoacrylate hydrogel via the “click-like” reaction between a secondary amine and alkynoate.

Methods: We performed a series of experiments to characterize the physical properties of this aminoacrylate hydrogel. We then evaluated the utility of this hydrogel as a cell culturing platform by investigating its interactions with cell culture media, potential sterilization methods, and structural integrity at physiological temperature. Additionally, we assessed whether these gels could be modified with RGDC peptide to improve cell adhesion.

Results: Sterilization and heating to physiological temperature did not affect the structural integrity of these gels. We also observed that changing the amount of amine and alkynoate increased the gel stiffness, and stiffer gels increased degradation time in cell culture media. Finally, modifying these gels with RGDC peptide increased cell adhesion.

Conclusion: Taken together, this aminoacrylate hydrogel is a promising platform for cell culture, and future studies will utilize this hydrogel to investigate the effect of extracellular matrix stiffness on cell behavior.

Importance: Aminoacrylate hydrogels overcome many limitations of other hydrogel systems as they are operationally simple, scalable, and non-toxic. These hydrogels are a viable platform for 3-dimensional cell culture and have the potential to be used as a new material to study biological phenomena.

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Recurrent SMART Syndrome

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Background: Stroke-like migraine attacks after radiation therapy (SMART) syndrome is a very rare and delayed complication of cranial irradiation. As the name suggests, it is characterized by migraine like headaches, seizures and reversible neurological deficits concerning for stroke. MRI brain shows presence of transient contrast enhancement of the cortex with white matter sparing in the region of previous radiation therapy. It is a self-limiting, reversible condition. It is often misdiagnosed as tumor recurrence, encephalitis, PRES and stroke.

Methods: Case report

We chart reviewed one patient with recurrent SMART syndrome. MRI brain of the patient before, during and after two episodes of SMART syndrome, one year apart, were reviewed.

Results: A 29-year-old female presented with seizures and MRI brain showed left frontal mass. She underwent resection and pathology showed Astrocytoma WHO grade 3, IDH mutated. She received six weeks of concurrent radiation therapy and Temozolomide followed by adjuvant Temozolomide. Five years later, she presented with seizures and was found to be in status epilepticus. MRI brain showed increased gyriform contrast enhancement in the left frontal lobe surrounding the resection site suspicious for SMART syndrome. The linear enhancement resolved in subsequent MRIs. Her seizures remained stable on multiple seizure medications. About one year later, MRI brain again showed gyriform contrast enhancement in the left frontal lobe. Follow up MRI brain two months later showed resolution of the areas of contrast enhancement raising the possibility of a reversible process like SMART syndrome.

Conclusion: SMART syndrome is a long-term side effect of radiation therapy. Awareness of SMART syndrome among radiologist, neurologists, neuro-oncologists and neurosurgeons is important to prevent unnecessary interventions like changing treatment regimens for brain tumor, brain biopsy or resection.

Importance: The research attempts to shed light on a rarely written-about event in hopes of aiding patients in the future.

Regulation of Cardiomyocyte Senescence by α_1A Adrenergic Receptors

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Background: Cellular senescence is a critical feature of cardiac aging and develops in an accelerated fashion in heart failure (HF). The regulation of senescence in the heart is poorly understood. Previous experiments have demonstrated that activation of α_1A -adrenergic receptors (α_1A -ARs) protects against the development of HF, and mice overexpressing these receptors have longer lifespans than their wildtype (WT) counterparts. However, no prior studies have examined whether α_1A -ARs regulate cardiomyocyte senescence. This study's aim was to determine if genetic loss of α_1A -ARs contributes to cardiomyocyte senescence.

Methods: RNA was isolated from the hearts of young and old wild type (WT) and α_1A -AR knockout (AKO) mice. Senescence and senescence-associated secretory phenotype (SASP) factor gene expression was then analyzed via quantitative real-time PCR (qRT-PCR).

Results: Our findings showed that old AKO mice exhibited a 1.5-fold increase in mRNA expression of senescence genes compared to old WT mice ($p < 0.01$). *CDKN2A*, which codes for the tumor suppressor protein p16 and is a well-studied senescence marker, was upregulated by 20-fold in the old AKO group ($p < 0.05$). Old AKO mice demonstrated a 50-fold increase of SASP factor mRNA expression compared to their old WT counterparts ($p < 0.05$). Significant differences in senescence and SASP factor mRNA expression were not seen between young WT and young AKO mice.

Conclusion: The results of this experiment suggest α_1A -ARs might play a role in cardiomyocyte senescence, predominantly in older mice. Further investigation is warranted to support these findings and quantifying senescence with other methods would be valuable to better understand the role of α_1A -ARs in regulating cardiomyocyte senescence.

Importance: This is the first study to examine the role of α_1A -ARs in cardiomyocyte senescence. Given the prevalence of HF is increasing in the United States, it is crucial to improve our understanding of cardiomyocyte senescence.

The Association Between Food Insecurity and Parental Feeding Patterns Prior To, and During, the COVID-19 Pandemic: A Scoping Review

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Background: Food insecurity (FI) is associated with parental feeding behaviors. The COVID-19 pandemic exacerbated food insecurity (FI), particularly among families with children.

Objective: Summarize literature on parental feeding patterns in the context of FI both prior to, and during, the COVID-19 pandemic.

Methods: A scoping review study was conducted. Terms related to FI and parental feeding practices were used to search literature published January 1, 2012 – April 21, 2023. Databases included MEDLINE (PubMed), EMBASE (Elsevier), PsycINFO (EBSCO), Cochrane Central (OVID), and Scopus (Elsevier). Eligible studies included (1) households in the U.S. with children under 18 experiencing FI (2) evaluation of FI, using a validated screener, and (3) the association with parental feeding practices using a validated screener. All studies were reviewed by two independent reviewers. Results were analyzed qualitatively.

Results: Seventeen studies were included. Eleven were conducted pre-pandemic and six during the pandemic. FI was frequently measured using a version of the United States Department of Agriculture Household Food Security Survey Module. Studies were heterogenous with regard to survey tool used to evaluate feeding practices. Evidence was mixed. Several studies described a positive statistically significant association between FI and controlling parental feeding, with an increase in pressured feeding behaviors during the pandemic.

Conclusion: FI may be associated with greater controlling parental feeding patterns. Published research on parental feeding patterns since the COVID-19 pandemic is limited. Future research is needed in this area given the increased prevalence of FI among families with children during the COVID-19 pandemic.

Is the Stomach of an ICU Patient Empty After 8 Hours Fasting?

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Background: The leading risk of anesthesia-associated morbidity and mortality is aspiration. As such, it is recommended patients fast eight hours prior to surgery. However, extended fasting can lead to complications in critically ill patients, including impaired wound healing, pressure injuries, muscle catabolism, and challenges in weaning from mechanical ventilation. While the assessment of gastric emptying has traditionally depended on clinical judgment and expert consensus, point-of-care gastric ultrasound (POCUS) offers an objective means to visualize and quantify gastric contents and volume. Yet, the application of POCUS for ICU patients remains underexplored. Gastric POCUS could potentially reduce unnecessary fasting durations or identify patients who still have a full stomach despite adhering to fasting guidelines.

Methods: For this proof-of-concept study, we secured IRB approval for a single-center, prospective investigation. The study unfolds in two concurrent phases: 1) Screening, obtaining consent, and scanning participants; 2) Reviewing patient charts before analysis.

Results: For an ICU patient, a six-hour fasting period resulted in a stomach cross-sectional area (CSA) of 9.06 cm² (Figure 1) and an antral grade of two, suggesting a high aspiration risk (Figure 2). An eight-hour fasting scan showed a reduced stomach CSA of 7.19 cm², corresponding to an antral grade of one. Guidelines indicate that an antral grade of one with a volume of .659 mL/kg is consistent with an empty stomach.

Conclusion: This case illustrates when an eight-hour preoperative fasting was necessary for a patient to achieve an empty stomach, as verified by gastric ultrasound, before undergoing general anesthesia. This demonstrates the utility of gastric ultrasound in assessing gastric content and volume at different fasting durations.



Figure 1. Subject 1 at six hours fasting.



Figure 2. Subject 1 at eight hours fasting.

Development of temperature-sensitive, injectable, tumor-mimicking alginate-based ultrasound phantoms for use in ultrasound research.

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Background: Lung cancer is the leading cause of death worldwide. The use of high-intensity ultrasound ablation for cancerous lung lesions is becoming increasingly popular as a safer alternative to current ablation modalities, including radiofrequency and cryotherapy. However, fabricating these ultrasound ablation devices requires lung tissue with lesions, usually through tumor-line research animals.

Methods: Here, we demonstrate a convenient, inexpensive, and injectable ultrasound phantom using readily available food-grade ingredients, namely sodium alginate. These tumor-mimicking nodules can be injected into both in-vivo and ex-vivo lung tissue, where they harden and can be ablated via ultrasound. Additionally, we show that by adding thermochromic, temperature-dependent dye to the nodules, researchers can visually assess the achievement of an ideal lesion temperature during ultrasound ablation.

Results: After injection and ultrasound ablation in ex-vivo porcine tissue, the thermochromic dye within the nodules irreversibly changed colors corresponding to the achieved temperature during ablation, allowing a gradient distribution to be generated. Further, the nodules successfully hardened following subpleural injection in a live pig, demonstrating their ability to be used in animal studies if needed.

Importance: These injectable lesions reduce the need for live tumor animals and provide a logistically simple method of testing ultrasound ablation. Furthermore, inexpensive, injectable alginate phantoms enable providers and medical students to develop and refine their ultrasound ablation skills.

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Protective Factors in Asymptomatic Patients with Pelvic Varices: Evaluating the Development of Pelvic Venous Disorders

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Background: Pelvic venous disorders (PeVD) often manifest as severe chronic pelvic pain and other symptoms, yet imaging findings of significant vessel dilation is also incidentally found in asymptomatic women. Given the known association of PeVD with vascular, obstetric, and chronic pain conditions, we sought to further comprehend the role of nociceptive antagonists in this polarity of outcomes. This study aimed to explore whether specific pharmacologic exposure, namely neurokinin-1 (NK1) receptor antagonists, calcitonin gene-related peptide (CGRP) receptor antagonists, and the nitric oxide (NO) release antagonist medroxyprogesterone, could serve as protective factors against PeVD symptom development.

Methods: An IRB-approved retrospective review was conducted on non-pregnant female patients who underwent CT abdomen pelvis contrast studies between January 2021 and July 2023. Using radiologic and health record queries, we identified patients with pelvic varices findings and categorized them into asymptomatic and symptomatic patients. Medical chart reviews were performed to ascertain prior history of antagonist factor use. Using SPSS, age-adjusted multivariate logistic regressions were conducted to determine odds ratios for the development of PeVD symptoms in relation to pharmacologic protective agents.

Results: Among 110 asymptomatic patients with pelvic varices findings (mean age: 59.5y ± 1.5; range: 23-91y), prevalent conditions included hypertension (38.3%), hypercholesterolemia (29.0%), hypothyroidism (23.4%), and malignancy (42.9%). The cohort averaged 2.7 pregnancies, and 54.5% reported a history of anxiety/depression. About 29.7% had taken neurotransmitter antagonists (substance P, CGRP, NO) for a period >1 year before imaging. Compared to a sample of age-matched patients (n = 55), these antagonists served as protective factors against the development of PeVD symptoms (OR: 0.09, 95% CI: 0.02-0.37, p<0.001). When controlling for malignancy as a confounder, prior antagonist usage remained protective (OR: 0.11, 95% CI: 0.03-0.49, p = 0.004).

Conclusion: Our preliminary results suggest that certain nociceptive pharmacologic agents, specifically antagonists of the NK1 receptor, CGRP receptor, and NO release, may offer protection against the manifestation of symptomatic PeVD.

Importance: Given the chronic nature of these symptoms, recognizing these agents can be pivotal for refining prevention and early indication strategies.

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Analysis of HPV Vaccine Related Content on TikTok

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Background: HPV is a well-documented cause of cervical, oropharyngeal, vaginal, vulvar, anal, and penile cancers, largely preventable with the HPV vaccine. We aimed to characterize the most popular TikTok videos pertaining to HPV-associated cancers and vaccination with a special interest in oropharyngeal cancer prevention.

Methods: The top 200 TikTok videos appearing under #HPVvaccine and #Gardasil individually were included and analyzed based on creator characteristics, viewer reach, content, and accessibility.

Results: Two hundred individual videos had an average reach of 129,525 views (SD 59,997). Of the creators, 43.2% self-identify as health care professionals and 69% were women. Although only 58% of videos were educational in nature, 79.6% were explicitly pro-vaccination. Cervical cancer was most dependably mentioned (60.9%) with only 18.0% citing all six known types of HPV-related cancer. Notable mentions include HPV prevention (62%), transmission (31%), infection risk factors (12%), genital warts (21%), appropriate age ranges (27%), and vaccine side effects (23%). Gardasil was identified as appropriate for men and women in 36% of videos. Only half of the content (54%) was accessible to persons requiring closed captioning. Discussion of Oropharyngeal HPV was present in 21.2% of videos but there were not any Otolaryngologist creators in the sample. We failed to find any correlation between content posting date and HPV Cancer Awareness Day (March 4, 2023).

Conclusion: Medical professionals have a strong presence on TikTok and overwhelmingly support HPV vaccination for cancer prevention but miss the mark in associating high-risk HPV with non-cervical cancers, addressing vaccine safety, and clearly defining who is eligible for the HPV vaccine. Despite oropharyngeal cancer eclipsing cervical cancer as the most common HPV-related malignancy, there is still a dearth of online patient education about this disease, and prevention measures available.

Importance: HPV associated head and neck cancer is an increasing public health concern largely preventable through vaccination. This study shows a stark lack of accurate and complete information regarding oropharyngeal HPV currently available on social media where many teens and young adults are viewing content.

Lipids in High-Density Lipoprotein (HDL) Subclasses and Risk of Myocardial Infarction (MI)

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Background: HDL cholesterol, together with LDL-c and triglycerides, are biomarkers widely used to assess risk of myocardial infarction (MI). Thereafter, apoA₁ and HDL particle number (HDL-P) were identified as biomarkers inversely associated with risk of MI. State-of-the-art nuclear magnetic resonance spectroscopy allows for profiling of lipidomic markers within HDL, providing an unprecedented opportunity to identify novel biomarkers of MI.

Methods: We examined associations between HDL lipid components and risk of MI in the UK Biobank. We leveraged the most up to date lipidomic data measured by NMR. A total of 8229 MI incidents were documented among 249,140 participants over a median 17.7 years of follow-up.

Results: Independent of existing risk factors including LDL-c, triglycerides, apo-A₁, HDL-P, the percentage of cholesterol over total lipids in HDL was inversely associated with the risk of MI with HR of 0.85 (0.76, 0.95), when comparing the highest quintile to the lowest. The percentage of triglycerides in HDL was positively associated with 1.13 (1.01, 1.26). We created the ratio of cholesterol to triglyceride within HDL and found it to be inversely associated with risk of MI (HR=0.89 [0.79, 0.99]). This finding is robust and consistently supported across subclasses of HDL.

Conclusion: The ratio of cholesterol to triglycerides within HDL particles may be a new marker of risk for MI, independent of existing biomarkers.

Importance: Given the unprecedented access to the lipidomic data and the UK Biobank, novel biomarkers, such as the ratio of cholesterol to triglycerides within HDL, can alter the way we look at a standard lipid panel. This can help improve how providers give guidance to their patients.

Utilizing the Tobra Bone Basket in TLIF Surgeries to Reduce Allograft Use and Decrease Patient Cost

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Background: Local morselized bone autograft (LMBA) effectively provides the osteogenic, osteoinductive, and osteoconductive properties necessary for successful spinal fusion; thus, autologous bone is considered the gold standard for spinal fusion procedures.¹ LMBA has demonstrated to be a cost-effective graft option, reducing the amount of allograft necessary.² A primary challenge in utilizing LMBA is collecting an adequate amount to fill the interbody cage and disc space, requiring surgeons to utilize a combination of autograft and allograft. The Tobra Bone Basket (TBB) effectively collects more morselized bone than a standard bone mill (mill), eliminating the use of allograft supplementation while substantially reducing costs.

Methods: In a retrospective electronic medical records review, we evaluated 200 sequential patients from one surgeon (JRE) receiving a transforaminal lumbar interbody fusion (TLIF) from 4/9/2021-5/18/2022. Graft use and price were compared using descriptive statistics between the TBB and mill group. Price comparison was strictly kept to related graft costs and standardized to account for potential price changes.

Results: Patients in the mill group (n= 96, average age 56.7, 52 female) almost exclusively required both LMBA and allograft (n=89, 92.7%). Patients in the TBB group (n=104, average age 60.3, 54 female) predominantly only utilized autograft (LMBA only n=84, 80.7%). In surgeries performed before 11/10/2021, a Stryker bone mill (\$400) and 5cc of allograft (\$450) were needed. When use of the TBB (\$180) was initiated, that resulted in a 78.8% (\$670) savings in graft costs representing ~80% of cases. The overall average cost was \$817 in the mill group and \$267 in the TBB group.

Conclusion: The Tobra Bone Basket provides substantial savings in graft related costs averaging 67%.

Importance: This substantial cost savings along with the benefits of LMBA provide strong support for continued utilization of this device.

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Analyzing clinical notes and patient-provider communications of People living with dementia (PLWD) and concurrent chronic conditions to identify factors that can prevent ED visits.

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Background: Over 90% of persons living with dementia (PLWD) have additional chronic medical conditions, with the latter accounting for much of their health care spending and health care utilization, including emergency and acute care. This reflects the challenges of managing chronic conditions in the setting of dementia. However, to inform the next iteration of innovative approaches to dementia care, the needs of PLWD and chronic conditions that come up leading to hospitalization need to be known.

Methods: We extracted outpatient clinical notes, patient portal messages, and hospital and ED encounters from the Johns Hopkins Health System clinical electronic medical record from 2017-2022, limiting it to adults with a previous diagnosis of dementia over the age of 65 who had at least 2 primary care visits over that period. The chronic medical conditions we focused on were advanced liver disease, COPD or interstitial lung disease, congestive heart failure, PAD/CAD, and chronic kidney disease. Using a qualitative approach, we analyzed the patient-provider communications, as well as clinical notes, with NVivo to identify issues with care coordination and chronic disease self-management among these older adults to determine unmet needs that could be amenable to intervention.

Results: We identified 128 individuals with dementia and an advanced chronic illness. The mean number of potentially preventable acute care visits per person was 1.9 (SD 1.8) hospitalizations, 0.4 (SD 1) ED visits over the 5-year period. A total of 123 individuals (96% of study population) contributed clinical notes (mean per person 3.87 notes, SD 3.0) and 33 individuals (26% of study population) contributed patient portal messages (mean per person 6.88, SD 6.8).

Conclusion: Qualitative content analysis of the patient portal messages and outpatient clinical notes revealed that issues with medications and management, care coordination, and health system navigation were by far the most ubiquitous.

Importance: Current models of health care for PLWD often do not incorporate chronic illness management. Those that do may improve care experience and caregiver support, but have not significantly reduced acute care utilization. Thus, our continued analysis will help to improve patient outcomes by incorporating a focus on non-dementia chronic disease maintenance.

Methotrexate in Immune Checkpoint Inhibitor-Induced Bullous Pemphigoid

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Background: Bullous pemphigoid is an autoimmune blistering disorder characterized by antibody-mediated bullae formation¹. Immune checkpoint inhibitor-induced bullous pemphigoid (ICI-BP) is a rare skin toxicity, affecting up to 1.0% of ICI-treated patients². ICI cessation is often necessary³ and existing algorithms for ICI-BP recommend systemic corticosteroids or biologic treatments, potentially blunting anti-tumor response⁴. Methotrexate represents a steroid-sparing, cost-effective immunomodulator with demonstrated benefit for ICI-induced psoriasis, BP unrelated to ICI use, and rheumatic immune-related adverse effects (irAEs); however few cases assess methotrexate use in ICI-BP⁵.

Methods: A retrospective case series was performed including 4 patients diagnosed with ICI-BP according to established diagnostic criteria who were seen at UNC Dermatology in the last 3 years. We collected demographics, oncologic history, irAEs, and ICI-BP features from chart review.

Results: Methotrexate duration ranged from 2.6 to 24.5 months with ongoing treatment (n=4) and dosages ranging from 7.5mg to 15mg weekly. All patients achieved complete resolution of disease activity on methotrexate and discontinued systemic steroids while on methotrexate (after average of 4.9 months) without BP flares. Cancer status following ICI discontinuation and BP treatment include cancer remission with no signs of recurrence or new active lesions (n=2), stable continued disease (n=1) and possible progression of disease (n=1). Only 1 patient (25%) experienced any adverse effect (fatigue, GI upset).

Conclusion: Unlike mycophenolate mofetil or azathioprine, two other medications commonly used treatments for autoimmune BP, methotrexate does not directly inhibit T-cells targeting the underlying cancer, and therefore may be less likely to trigger tumor progression, which leads to reduced overall survival⁷⁻⁹. Overall, methotrexate demonstrated efficacy and tolerability, with all 4 patients achieving complete remission of ICI-BP and only one patient experiencing any adverse effect, which did not require discontinuation, during methotrexate therapy.

Importance: Our findings suggest a favorable response to methotrexate in patients with ICI-BP and suggest that early introduction of steroid-sparing agents like methotrexate can minimize prolonged high-dose systemic corticosteroid exposure, and thus has potential as a more desirable intervention than published guidelines for systemic corticosteroids use in ICI-BP. More research is warranted to better understand the impact of methotrexate treatment of ICI-BP on tumor progression.

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International Relapsed/Refractory (R/R) Pre-B Acute Lymphoblastic Leukemia (ALL) Patients & Their Journey to Receiving Chimeric Antigen Receptor (CAR) T-cell Therapy

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Background: Pre-B cell Acute Lymphoblastic Leukemia (ALL) when, relapsed or refractory (R/R), can be fatal in pediatric and adolescent young adult populations. Immunotherapies like Chimeric Antigen Receptor (CAR) T-cells redesign host's T-cells to target and kill cancer cells. The National Institute of Health's Pediatric Oncology Branch (NIH POB) is an international and domestic referral center for treatment of R/R pre-B ALL with CAR-T therapy.

Methods: There are 52 international patients in the study and their home countries are classified as High Income, Upper Middle Income, and Lower Middle Income countries (H/ U-M/LM) as per the World Bank. Retrospective chart analysis of patients, receiving treatment between 2011-2022, was performed along with analysis on R software.

Results: Patients coming from H/UM-Income countries have greater median prior lines compared to patients from LM-Income countries. Prior infections reported in international patients are unique. On Arrival to POB, hematologic labs do not vary based on country classification. Complete Remission at day 28 restaging following CAR-T therapy was seen irrespective of income classification.

Conclusion: International R/R pre-B ALL patients undergo extensive prior treatments along with challenges of travel and cultural barriers as they navigate care.

Importance: In the next steps of this project, data about domestic R/R pre-B ALL patients (n=76) will be collected and analysed. The international patient population and the domestic patient population will be compared for parameters to look for outcomes of therapy, prior lines and other variables which will better navigate care for international patients seeking care at the POB or NIH.

Gaps in Care: Empowering Asian Representation in Clinical Cancer Research

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Background: Cancer remains to be the leading cause of death for Asian/Pacific Islanders (APIs) in the United States (US), surpassing other racial groups.¹ Despite the grave health disparities in the API community, literature about API research engagement, clinical treatments, and health outcomes are limited. High minority refusal rates, especially among APIs, has disproportionately represented White women in clinical trials (CTs).

Methods: We examined participation in three therapeutic, non-interventional breast cancer (BC) CTs that aim to develop early detection/prevention methods in the high-risk (HR) population. Fisher exact two-tailed test was conducted to analyze the refusal rates across different demographics in these CTs.

Results: 426 patients were eligible, 368 patients consented and 58 declined. 17.6% of consented patients were of API descent, with 2.9% South Asian, 35.7% Chinese, 7.1% Filipino, 11.4% Korean, 4.3% Japanese, 5.7% Vietnamese, 2.9% Thai, and 4.3% PI. API patients (10.9%) were identified as the second HR group after White women to have a genetic mutation or family history of BC and ovarian cancer. Of those who declined, 23.5% were Asians, 13.9% Hispanic, 8.3% Blacks, 5.6% Native Americans, and 11.4% White/non-Hispanic. Asians had the highest refusal rate across all groups. Asians had significantly higher rates of compared to Whites ($p = .02$, observed odds ratio = .42, 95% CI [.20, .86]), but were not significantly different than Blacks or Hispanics. Educational levels were not a significant factor in API refusal rates.

Conclusion: High refusal rates and aggregation of Asians engender issues in the collection and interpretation of these data. Differences in representation in clinical research may explain the higher cancer-related deaths in the Asian community compared to other groups. Prospective studies are needed to identify motivators for clinical research trial participation, increase diversity, and optimize treatment strategies for this HR population.

Importance: CT findings have not been representative of the diverse patient population and have stymied progress in precision medicine and cancer prevention. Future studies are needed to inform treatment plans for all cancer patients.

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Use of Apple Watch to acquire baseline wearable biometric data for patients with sickle cell disease and correlations to symptoms such as pain and fatigue

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Background: The unpredictable nature of vaso-occlusive crises puts Sickle Cell Disease patients at risk for further complications, limits their daily activities, and affects their quality of life.¹ Within this study, we aimed to investigate the use of mHealth and wearable devices to 1) Establish a comprehensive baseline health profile for individuals with SCD, and 2) determine potential relationships between patient-reported symptoms and biometric data.

Methods: Using Apple Watches and the Nanbar Health application, we collected biometric data, and self-reported symptoms and feelings, respectively, over 6 months. Statistical and network analysis was performed to analyze the correlations between symptoms, biometric data, and the well-being of the participants.

Results: 18 participants (10 female, 8 male) were enrolled with a median age of 25 (IQR 21-33). All the participants were Black/African American, and most were either HgbSS (72%) or HgbSC (16%). The average pain score participants reported was 5.9 (SD 2.4, n=220). The most commonly reported symptoms, aside from pain, were tiredness (22.1%), headache (5.2%), and priapism (5%). Biometrics measured were heart rate (105.1 bpm, SD 26.8), HRV(31.9 ms, SD 13.3), and daily step count (4100 steps/day, SD 5960). Significant correlations included pain and priapism ($r=0.85$, $p<0.01$), aching and pain ($r=0.78$, $p<0.01$), and feeling bad and aching ($r= -0.74$, $p<0.01$). Network analysis showed that RHR and HRV had a stronger influence on patient well-being than other collected biometrics.

Conclusion: Baseline biometric characteristics for patients were similar to other diseases with chronic pain. As expected, pain is the most common symptom reported. There was no strong correlation (>0.7) between biometrics obtained by the watch and SCD patient-reported pain scores or symptoms. The strongest correlation within the study was between feeling tired and feeling cold.

Importance: The study's findings contribute to a better understanding of the pain and well-being of SCD patients. The findings also demonstrate how mHealth and wearable devices can be used for monitoring and managing the disease through real-time data and analysis.

Primary care physicians' knowledge and confidence in providing cancer survivorship care: a systematic review

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Background: Cancer survivorship care is the care of a person with cancer from the time of diagnosis until the end of their life (Hewitt, 2006). This care includes prevention and surveillance for cancers; surveillance and management of psychosocial effects, physical effects and chronic medical conditions; health promotion; and disease prevention (Nekhlyudov, 2019). Oncology-led cancer survivorship care remains common but may be less sustainable or effective to comprehensively treat cancer patients compared to primary care provider (PCP)-led care. Previous reviews discuss PCP attitudes and perceptions of PCP-led care. Since there have not been reviews that assess PCPs' knowledge and confidence of cancer survivorship care, the purpose of this review is to provide that information.

Methods: PubMed, Ovid MEDLINE, CINAHL, Embase, and PsycINFO were searched from inception to July 2022 for quantitative and qualitative studies. Two reviewers independently assessed studies for eligibility and quality. Outcomes were characterized by domains of quality cancer survivorship care.

Results: Thirty-three papers were included, representing 28 unique studies; 22 cross-sectional surveys, 8 qualitative, and 3 mixed-methods studies. Most studies were conducted in North America (n = 23) and Europe (n = 8). For surveys, sample sizes ranged between 29 and 1124 PCPs. Knowledge and confidence in management of physical (n = 19) and psychosocial effects (n = 12), and surveillance for recurrences (n = 14) were described most often. Generally, a greater proportion of PCPs reported confidence in managing psychosocial effects (24-47% of PCPs, n = 5 studies) than physical effects (10-37%, n = 8). PCPs generally thought they had the necessary knowledge to detect recurrences (62-78%, n = 5), but reported limited confidence to do so (6-40%, n = 5). There was a commonly perceived need for education on long-term and late physical effects (n = 6), and cancer surveillance guidelines (n = 9).

Conclusion: PCPs' knowledge and confidence in cancer survivorship care varies across care domains. Suboptimal outcomes were identified in managing physical effects and recurrences after cancer.

Importance: These results provide insights into the potential role of PCPs in cancer survivorship care, medical education, and development of targeted interventions.

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Sinogram Inpainting to Improve Imaging in Novel Stationary CT Scanner

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Background: Sparse sampling for computed tomography has been proposed as an approach to reduce both radiation dose and scan time. Our team has developed a stationary head CT (s-HCT) configuration with three planes that offers near complete sinogram coverage using stationary carbon nanotube (CNT) x-ray source arrays and detectors¹. The lack of motion of the x-ray source and detectors increases reliability in low resource settings. However, the sinogram coverage using this configuration has known missing angles due to gaps between detectors, and about one third the projection angles as a conventional CT. Less angles results in less radiation exposure, however reconstructions produce more artifacts and therefore lesser image quality. We hypothesized that sinogram in-painting approaches applied to our geometry can create a more accurate reconstruction with fewer artifacts. Our approach is to increase the number of sinogram projection angles and complete known patches of missing data then comparing the reconstructed inpainting result to the ground truth source image.

Methods: Wei et al, 2020, developed a super-resolution network to increase the number of angles in a sparse-view, circular geometry, sinogram². A version of their approach was modified to accommodate the specific geometry of the s-HCT and increase the number of projection angles in the sinogram by three and fill in detector gaps. Sinograms for training were generated from an open-source dataset. 9811 sinograms were used for training and 500 were used for testing.

Results: This research is still in progress. Preliminary results show qualitative improvement and the reduction of artifacts in the in-painted images. Using Google Co-Lab, the program ran for a max of 4 hours for 11 epochs. A new computer has been acquired to improve training time and increase epochs. We expect more specific results in the coming weeks.

Conclusion: Sinogram projection line in-painting approaches are useful in improving image quality in the novel sHCT geometry. The simplicity of this approach suggests that other novel CT geometries may be considered and prototyped with the CNT x-ray sources.

Importance: Sinogram in-painting approaches have the potential to maintain image quality while reducing radiation dose to patients.

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A Pilot Quality Improvement Intervention: Multidisciplinary Fall Prevention Initiated within the Emergency Department

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Background: Recent studies have identified the emergency department (ED) as a promising setting for implementing multidisciplinary fall prevention interventions.

Methods: A quality improvement intervention was implemented at two North Carolina Hospitals among adults age 65+ presenting to the ED with a chief complaint of fall. Patients received a pharmacy, physical therapy (PT), and/or occupational therapy (OT) consultation(s) to address risk factors for future falls. We conducted a retrospective evaluation of electronic medical records over 3 months (May-July 2023) to determine feasibility.

Results: Among 475 patients (509 visits) presenting to the ED with a chief complaint of fall, 32.2% (n=153) received the intervention. Most were female (67.3%) and non-Latino/a White (81.0%). The median age was 80 and most were admitted (88.9%) from the ED. Among individuals who received intervention, most received PT and OT evaluations (97.4% and 96.1%) and fewer received a pharmacist consultation (15.7%). The most common problems identified in PT evaluations were “decreased mobility” and “impaired balance” and for OT evaluations most frequent problems were “fall risk” and “impaired ADLs”. In-home follow-up care was the most common recommendation from PT and OT. The median number of high-risk medications identified by pharmacy was two (most frequently anticoagulants and antidepressants). The most common recommendation was to “discuss risks and benefits with a primary care physician”.

Conclusion: The ED may be an opportune setting for addressing mobility and medication-related risk factors for falls in older adults. Improved implementation of screening and assessment is needed.

Importance: A feasible multidisciplinary falls prevention program supported within the ED could potentially lessen the risk of subsequent falls and ED visits in older adults.

A Novel Medical Student-Run Auditing System for Unintentionally Retained Foreign Object Prevention

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Background: Unintentionally Retained Foreign Objects (URFOs) are uncommon (between 0.3 and 1.0 per 1,000 abdominal operations¹) but potentially devastating surgical complications²⁻⁴. To reduce the incidence of URFOs, our organization implemented an improved closing instrument and soft goods count protocol that required behavioral changes from operating room (OR) staff. This project aimed to evaluate the efficacy of a medical student volunteer system to audit critical behaviors in the new URFO prevention program.

Methods: A multidisciplinary task force was convened to design the auditing process, and one medical student was selected to oversee the team. Eighteen students were recruited and underwent training, which included a slideshow presentation, a video example of the critical actions, a hospital tour, and a walkthrough of an audit. During audits, students observed the completion of seven critical actions, and audit data was collected and reported every two weeks.

Results: Over the first ten weeks of the new protocol, students completed 114 audits across 18 surgical departments, and there were zero URFOs. Between 19 and 28 cases (approximately 11-16% of daily cases) were audited every two weeks. In each period, between 2 and 8 cases with missed critical actions were observed. The medical student auditors were able to navigate the OR space and complete audits without incident.

Conclusion: We found that utilizing a team of medical student volunteers as auditors can be a feasible method of supporting leadership during complex systems changes in a hospital setting.

Importance: Unintentionally retained foreign objects are uncommon but devastating surgical complications, and system-wide protocol changes can be implemented to reduce the risk⁵. Monitoring for adherence to new behavior protocols is necessary to monitor how those behaviors contribute to the success of the program.

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Use of Appropriate Blood Pressure Measurement Technique to Lower Prevalence of Uncontrolled Hypertension at NeighborHealth Federally Qualified Health Center

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Background: Of the 45.4% of US adults with hypertension, only 44% are controlled.¹ Blood pressure (BP) control is less among Black and Hispanic patients, middle-aged patients, and patients without insurance.² Hypertension metrics were identified as an area of needed improvement at NeighborHealth Federally Qualified Health Center in Raleigh, North Carolina, where 24.9% of the clinic population identifies as Black/African American and 28.0% identifies as Hispanic. One third of clinic patients are self-pay and half have Medicaid.

Methods: A workshop was held for clinic Medical Assistants (MAs) to review proper patient positioning and manual BP measurement technique. Chart review was conducted for all patients with upcoming appointments during a two-month period under one provider's panel, with 38 patients qualifying as having hypertension. These patients' problem lists were updated to reflect their diagnosis of essential hypertension. During these appointments, in hypertensive patients with initial BPs >140/90, manual BP recheck was performed after the patient had been quietly sitting for five minutes.

Results: After the workshop, MAs' self-reported confidence with positioning patients improved ($p=0.081$), as did their confidence with manually taking BPs ($p=0.037$). Of the 38 identified hypertensive patients, 30 had initial BP >140/90. Performing BP recheck after five minutes with proper technique for 27 of these 30 uncontrolled hypertensive patients resulted in an average decrease of 17.59mmHg in systolic BP ($p<0.01$) and an average decrease of 3.00mmHg in diastolic BP ($p=0.046$). Thirteen of the 27 measurements improved to the low-risk target of <140/90, and four improved to the high-risk target of <130/80. All statistical analyses were performed using a two-tailed paired t test.

Conclusion: Overall high-risk BP control remained low, likely in part because most improved BP measurements were still above the high-risk cutoff of 130/80. The statistically significant decrease in BPs after rechecking suggests erroneous overreporting of the severity of uncontrolled hypertension in this patient population.

Importance: Further work on this topic could have a significant impact on accurate hypertension reporting and future disease management among this clinic's high-risk population. More accurate BP measurements could also affect performance metrics and funding for this federally qualified health center.

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Reconstructing Person-Centeredness From a Systems Perspective: Implications for the Care of Older Adults

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Background: Person-centeredness has become a common, almost hackneyed phrase in the context of care for older adults, despite a lack of consensus regarding its definition, measurement, and application. As part of a series of studies aimed at better understanding person-centeredness, we sought to identify key themes about person-centeredness as it applies to the system (macro) level, as opposed to the setting (meso) and interpersonal (micro) levels.

Methods: Four think-tank meetings (two in-person; two virtual) were held and results analyzed; the 32 participants included researchers, providers, policy makers, ethicists, and consumers. Think-tank meeting prompts addressed a range of systems, including education, government, workplace, and healthcare. Analyses identified themes associated with variation in person-centeredness.

Results: Five key themes emerged: (1) The goals and manifestation of person-centeredness vary depending on the type of system, level within a system, and the role of the individual within the system. (2) Principles of person-centeredness from the hospitality industry can be applied to other settings, including healthcare and long-term care. (3) Some limits on person-centeredness are necessary for system success. (4) The amount of person-centeredness provided in a setting depends on available resources such as time and money. (5) Societal inequities, such as discrimination, bias, and language barriers, hinder person-centeredness.

Conclusion: Presentation of results will draw parallels between a variety of systems, demonstrating universal applicability, including to healthcare and long-term care for older adults.

Importance: The themes identified may help guide future policy and practice regarding realistic and effective application and evaluation of person-centeredness in relation to the care of older adults.

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Analyzing outcomes of Veno-venous Extracorporeal Membrane Oxygenation in treating Acute Respiratory Distress Syndrome based on patient BMI

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Background: Acute respiratory distress syndrome (ARDS) is commonly seen in critically ill patients, with severe cases requiring extracorporeal membrane oxygenation (ECMO). Higher BMI is considered a relative contraindication for ECMO due to increased mortality risk, however there is a lack of outcome information in this population. We aimed to stratify VV-ECMO mortality by BMI category to identify if there is a difference in outcomes between classes.

Methods: Patients >18 years old placed on VV-ECMO at UNC from 2014-2022 were identified. Demographic data and mortality outcomes were analyzed. Binomial logistic regression modeled mortality odds ratio for each BMI category while controlling for confounders including age, sex, race, COVID-19 status, and Charlson comorbidity index.

Results: We analyzed 313 patients with a crude mortality of 52.1%. The cohort was predominately male (64.6%) and 49.5% had COVID-19. The odds ratio for mortality was significantly increased in 30-35 and 35-40 BMI categories. Patients with BMI >40 did not have an increased mortality risk.

Conclusion: Class I and II obesity groups had increased mortality odds compared to normal weight, which aligns with relative contraindication of elevated BMI for ECMO. However, the morbid obese class III did not follow this trend and showed no significant increase in mortality odds, which is potentially explained by the obesity paradox.

Importance: Severe cases of ARDS can require patients to be placed on ECMO for treatment, however the relative contraindications of ECMO including BMI have not been well studied. Not all obesity groups had increased mortality as described in this study, proving further examination of ECMO guidelines are needed to ensure groups that could benefit are not excluded from treatment.

Diverse goals of patients in Bridges to Health program demonstrates need for multidisciplinary health care teams

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Background: Bridges to Health was established in Hendersonville, NC, to offer drop-in group medical appointments (DIGMAs) with on-site multidisciplinary team and support staff to provide a safe, accessible environment for high-risk patients. It was hypothesized that health care delivery that focuses on access, team-based support, and the defined needs and goals of patients will offer insight into how care delivery can be most impactful for patients with the high need.

Methods: The model of care delivery included DIGMAs comprised of a team of a physician, nurse care manager, behavioral health counselor, peer counselor, occupational therapist, and clinical pharmacist. In addition to medical services, other services include care management, medication assistance, transportation, nutrition, and social support. A retrospective cohort study analysis categorized patient goal domains and demonstrated how patient centered goals reflected diverse needs.

Results: The distribution of total goals in the four goal domains was as follows: 40% were categorized as Medical, 31% as Social Drivers of Health, 17% as Behavioral and Emotional, and 12% as General. Moreover, most patients, over the course of their group experience, had goals that bridged across multiple domain categories.

Conclusion: Using self-goals to demonstrate patients' needs predicts the considerations for multidisciplinary models of care delivery that better aim to serve this complex patient population. The implications of these findings demonstrate that care models should aim to accommodate patients' needs beyond a medical focus.

Importance: Our medical team is failing many patients, and this study highlights the potential benefits of a multidisciplinary, drop-in style of care model for certain patient populations. Further studies like this one are needed to convince our medical system that systemic change is necessary to serve all patients more completely.

Altered Gait and Grip Strength Following Brachial Plexus Birth Injury

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Background: Occurring in 1-3 out of every 1,000 births, brachial plexus birth injury (BPBI) is a common nerve injury in children and causes muscle paralysis, bone deformities, and lifelong arm impairment, often requiring surgery. Previous studies have reported osseous deformities that differ with injury location, but little is known about the extent to which limb disuse exacerbates these deformities or about the changes that can occur to limb strength following injury. Our objective was to determine how injury type and limb disuse contribute to gait impairment and grip strength in a rat model of BPBI.

Methods: Sprague Dawley rats (n=18-57 per group) underwent surgery at postnatal day 3-6 for postganglionic neurectomy (mimics nerve rupture), preganglionic neurectomy (mimics nerve avulsion), sham injury, or elbow disarticulation (mimics disuse without nerve injury). Three and four weeks after surgery, grip strength of both forelimbs was assessed using a force gauge with 3 trials per limb. Gait patterns were recorded for walking (5 m/min) on a treadmill. For rats who functionally bear weight with their injured limb, stride length, stride time, and stance time were measured using Kinovea. Groups were compared with ANOVAs ($\alpha=0.05$) and Tukey posthoc tests.

Results: Grip strength of the uninjured limb was greater for postganglionic, preganglionic, & disarticulation injuries compared to sham, suggesting potential compensatory usage of the uninjured rather than injured limb for daily activities by these groups, since they do not have two functionally weight-bearing limbs like sham.

Conclusion: Early loss in grip strength following postganglionic and preganglionic injury indicates that muscle deficits extend to the forearm and hand and likely contribute to impaired locomotion and functional shoulder movement.

Importance: The ultimate goal of this work is to mitigate the detrimental effects of BPBI by developing more effective and targeted treatments. Understanding changes in functional limb usage after BPBI is essential for guiding clinical therapies after injury.

Pediatric Ewing's Sarcoma and Permanent Chemotherapy-Induced Alopecia: A Case-Control Study of Previously Unreported Diagnoses in Children

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Background: Permanent chemotherapy-induced alopecia (PCIA) is a rare diagnosis that is made when alopecia persists for greater than six months following the cessation of chemotherapy [1, 2]. At our institution, there have been observed instances of PCIA in pediatric Ewing's Sarcoma (ES) patients who have completed chemotherapy treatment. We hypothesize that the type and cumulative dosage of chemotherapeutic agents used to treat ES, as well as a family history of hair loss, are risk factors for the development of PCIA in pediatric ES survivors.

Methods: Three patients were identified who were diagnosed with PCIA after treatment for ES between 2010 and 2020 at UNC Dermatology. Nine patients were identified who were treated for ES and did not develop PCIA. All charts were reviewed for pertinent demographic information and disease characteristics. Data analysis was performed using descriptive statistics.

Results: Of the 12 patients included in this study with a history of pediatric ES, three developed PCIA. A paired t-test analysis of the mean administered cumulative dose of five chemotherapy agents showed no statistical significance between the PCIA and control groups. Two of three patients in the PCIA group were found to have a family history hair loss; for the remaining one patient with PCIA and all patients in the control group, information regarding a family history of hair loss was not available.

Conclusion: We did not find any significant difference in the cumulative dosage of chemotherapeutic agents used to treat ES between the PCIA group and the control group. We conclude that further research is needed to understand the impact of cumulative chemotherapy dosing and family history of hair loss in the pathogenesis of PCIA in pediatric ES patients.

Importance: To our knowledge, there are no reports of PCIA in pediatric ES patients in the current literature. Although ES is a rare diagnosis, our research suggests that PCIA is a not-uncommon complication of ES treatment, as it was observed in 25% of patients included in this study; for this reason, we believe that patients and their families should be counseled regarding the risk of PCIA associated with ES treatment.

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Hidradenitis Suppurativa: Perceptions on reproductive health, personal and intimate relationships

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Background: Hidradenitis suppurativa (HS) is a chronic inflammatory condition that causes painful and disfiguring lesions. Although this condition predominantly affects women of reproductive age, there is a lack of data concerning how HS impacts their personal and sexual relationships. The objective of this study is to assess how women perceive HS affecting their self-image and their personal and intimate experiences.

Methods: A survey was developed at a single site, based on existing literature. The questionnaire was administered and collected after in-person appointments at dermatology clinics at UNC Chapel Hill.

Results: Preliminary data encompassed 144 responses. The average age at the time of HS diagnosis was 20 years, with the most affected areas being the genital region (74%) and the perianal region (45%). An overwhelming 80% of respondents believed that HS-related pain interfered with their intimate relationships, and 49% reported terminating a relationship due to their partner's response to HS. Additionally, 63% of single respondents admitted to experiencing a fear of rejection when meeting potential partners due to their HS condition. The study also revealed a significant correlation between the number of affected areas of HS and more negative survey scores, with the buttocks and perianal region showing the most significant impact.

Conclusion: Preliminary analysis shows the women with HS experience a range of negative experiences due to the inflammatory skin condition. Further analysis is currently in progress to determine how factors such as race, age, severity, and specific HS characteristics impact the extent of negative experiences.

Importance: This study highlights the profound impact of Hidradenitis suppurativa on women's lives, particularly in terms of their relationships and self-image. Understanding these psychosocial aspects is essential for providing more comprehensive care and support for individuals with HS.

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Modernization, Manipulation, and Mass Sterilization: India's Family Planning Program and the Loss of Bodily Autonomy

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Background:

Following the end of colonial rule in 1947, population control became central to India's post-colonial modernization efforts. U.S. nonprofits (and eventually the U.S. government) entered the scene prepared to remedy the population "problem" by introducing technological and policy interventions to reduce population growth by any means necessary. This culminated in the "Population Emergency" policy era between 1975 and 1977, when the Indian government sterilized over 8 million people without their consent using IUDs.

Methods:

A year-long archival research project based in Princeton and Duke University libraries. This included historical analysis of government records, nonprofit foundation reports, political correspondence, and advertisements to trace the evolution of India's population control efforts from 1947 – 1974.

Results:

U.S. and Indian policymakers realized that efforts to distribute contraceptives would be in vain without a cultural shift around family planning in India, particularly among the rural poor who historically had the highest birth rates. In the late 1950s, they grew frustrated with the lack of results from community education initiatives to increase demand for contraceptives and shifted to pushing citizens towards "long-term" technological solutions like the IUD and sterilizations. By the 1960s, the Indian government had implemented aggressive advertisement campaigns and financial incentives for these measures. Civilians accepting IUD insertion received food rations or cash, and physicians who performed a minimum of 150 insertions in a month received cash bonuses.

Conclusion:

From its independence to the Population Emergency era, India shifted from a family planning program to a population control regime to lower its population growth rate. U.S.-backed interventions sought to both fundamentally alter ("Westernize") the cultures of developing countries by socially (and economically) manipulating the Indian population, and by aggressively pushing birth control technologies such as the IUD onto women, circumventing their agency and autonomy. While historians have argued that this outcome would have been prevented had policymakers relied less on technological solutions like the IUD, this study argues that socio-

economic factors were not only taken into account, but provided the ideological basis for the coercive policies that pushed contraceptive measures onto civilians without their consent.

Importance:

This study highlights the harm that can be done not only by medical technologies, but by the social programs that promote them. It contextualizes India's population control campaigns in neo-colonialism.

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Subjective Versus Objective Measures of Functional Ability in End-Stage Knee Arthritis Patients Pursuing a Total Joint Arthroplasty

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Background: Subjective patient self-assessment of knee function in end-stage osteoarthritis (OA) using patient-reported outcome measures (PROMs) has become standard for defining disability and determining postoperative status following total knee arthroplasty (TKA). The relationship between PROMs and objective knee kinematics requires continued investigation given the relatively high dissatisfaction rate of TKA. The purpose of this study was to determine correlations between patient characteristics, PROMs, and functional performance measures using a marker-less image capture system (MICS).

Methods: PROMs were collected prospectively for a quality improvement initiative using the Knee Injury and Osteoarthritis Score for Joint Replacement (KOOS-JR), which provides a raw score from 0 to 28 points, and reviewed retrospectively for this study. Eligible patients completed an office-based functional assessment using a MICS and provided their age, body mass index (BMI), and gender. A total of 112 patients were enrolled with a mean age of 65.0 (± 9.7) years, mean BMI of 32.5 (± 6.6) kg/m², and mean KOOS-JR score of 14.5 (± 5.7). The relationships between variables were described using Spearman's correlation coefficients.

Results: Age and gender were not significantly related to KOOS-JR scores, but BMI was weakly correlated to them ($\rho = -0.22$, $P = .024$). Neither age nor BMI were significantly correlated with MICS performance scores, but men tended to score higher than women. There were weak to no correlations between KOOS-JR scores and MICS Alignment ($\rho = -0.01$, $P = .951$), Mobility ($\rho = 0.33$, $P < .001$), and Total Joint scores ($\rho = 0.06$, $P = .504$).

Conclusion: The lack of strong correlation between subjective and objective measures of functional ability for end-stage knee OA suggests that continued TKA dissatisfaction may not be explained by traditional PROM instruments alone. Although this study is limited to using a single PROM measure (i.e., KOOS-JR), it warrants further investigation into the relationship between those subjective tools and kinematic performance in large populations.

Importance: This investigation demonstrated the ability to add objective measurement tools to a busy clinical environment with the potential to enhance physical therapy and improve patient outcomes. Further studies should compare the efficacy of various functional assessment modalities to optimize both preoperative and postoperative planning.

Mutations in the hexose phosphate transporter UhpC are associated with altered virulence gene expression in *Chlamydia trachomatis*

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Background: *C. trachomatis* is less pro-inflammatory, with reduced transcription of virulence-associated plasmid (*pgp3*) and plasmid-responsive chromosomal (*glgA*) genes, when chlamydiae infect glucose-limited cells (1). Expression of OmcA and OmcB, proteins present only in infectious elementary bodies (EB) that mark reticulate body (RB) to EB conversion (2), is also reduced with low glucose but the mechanisms regulating this response are poorly understood. Chlamydiae use the hexose phosphate transporter UhpC (3) to obtain glucose-6-phosphate directly from their host, so we hypothesized that the low glucose transcriptional response would be altered in strains carrying mutations in UhpC.

Methods: Using *C. trachomatis* mutants transformed with a reporter plasmid carrying *omcA::gfp*, we examined the effect of 2-deoxyglucose (2DG) administration and restricted glucose supplementation on expression of the fluorescent reporter. Infected cells were live imaged or fixed and stained 28 or 40 hours post infection with anti-Pgp3 or anti-OmcB antibodies to assess protein expression. The impact of glucose limitation on production of infectious progeny was quantified.

Results: One mutant, M2-C6 (UhpC^{A394T}), was sensitive to 2DG at concentrations that did not suppress inclusion formation by wild type (WT) chlamydiae. While sub-inhibitory concentrations of 2DG was associated with reduced *omcA::gfp* expression in WT, reporter expression appeared unaltered in M2-C6. These responses were mirrored when the strains were cultured in glucose-limited medium with dysregulated expression of *omcA::gfp* visible in RBs. Finally, complementing M2-C6 with a plasmid carrying inducible *uhpC* restored 2DG responsiveness.

Conclusion: A mutation in UhpC previously associated with reduced substrate transport, is also coupled to dysregulated *omcA* transcription.

Importance: *C. trachomatis* is an obligate intracellular bacterium that infects ~100 million people annually worldwide and leaves ~1 million women infertile. This study suggests that chlamydiae respond to fluctuating glucose availability by activating a pathway that leads to down-regulation of genes associated with infectivity and virulence. This cell culture-based study indicates that glucose sensing is important for survival of this genital tract pathogen and may contribute to chronic infection with reduced immunopathologic potential.

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Characterization of Comorbidities and Mortality in Barrett's Esophagus Patients Treated with EET

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Background: Barrett's esophagus (BE) is a common precursor of esophageal adenocarcinoma that is treated with endoscopic eradication therapy. The mortality and comorbidities among patients with BE are poorly described. This study aims to describe the mortality rate, the distribution of comorbidities, and the value of comorbidity scores in predicting mortality in this population.

Methods: We performed a retrospective study of adult patients who underwent endoscopic eradication therapy for dysplastic BE at the University of North Carolina Hospitals between 2006 and 2013. We reviewed comorbidities at the baseline clinic visit to calculate various comorbidity scores using both the original and updated Charlson score weights with and without the inclusion of age as a weighted comorbidity^{1,2}.

Results: A total of 281 patients were enrolled, among which myocardial infarction (18.9%) and non-metastatic solid tumor (16.3%) were the most common comorbidities. The average Charlson Comorbidity Index score using weights from the Original Charlson score, including points for age, was 3.26 (standard deviation 1.91), with a higher score in patients with higher baseline histologic grade of Barrett's dysplasia.

Conclusion: A retrospective cohort study of comorbidities in patients undergoing endoscopic eradication therapy for dysplastic BE found solid tumors and ischemic heart disease were the most common comorbidities. Comorbidity indices of treated patients with neoplastic BE were comparable to studies of patients with BE irrespective of their treatment status and were higher than the general population. Once data is obtained from the National Death Index, we will examine the overall and cause-specific mortality among patients being treated for dysplastic BE and evaluate the value of the Charlson Comorbidity index scores in predicting mortality.

Importance: Several studies have found that patients with BE have higher rates of mortality than the general population^{4,5} and that the predominant cause of death in patients with BE is cardiovascular disease, not esophageal adenocarcinoma^{6,7}. We hope that our findings will inform future patient-centered and cost-effective clinical guidelines for endoscopic treatment and surveillance for dysplastic BE.

Chronic Pain Following ORIF Surgery

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Background: Open reduction internal fixation (ORIF) is a common treatment of fractures because it allows for shorter hospital stays and earlier return to function.¹ Patients undergoing ORIF are at high-risk of inadequate post-operative pain control which may contribute to chronic post-surgical pain and opioid use.²⁻⁶ However, the incidence of and risk factors associated with chronic post-ORIF pain have not been determined. Further, it is unclear whether intraoperative techniques to manage perioperative pain impact long-term outcomes.

Methods: This was a cohort study in which data was retrospectively extracted from patient medical records. We included adults aged 18-65 years who underwent ORIF surgery at UNC Hospitals during the years 2016-2018. We excluded patients whose fractures were either non-traumatic or due to osteoporosis, and those who suffered significant comorbid injury. This yielded a cohort of 203 patients. Chronic pain was defined as a pain severity ≥ 4 at least 3 months after surgery assessed at outpatient post-op visits. 89 patients had follow-up past three months and are included in this study. Multivariate statistical modeling and a linear repeated measures model was used to evaluate the association of patient characteristics and chronic pain severity.

Results: The incidence of chronic pain following ORIF surgery was 49% (44/89). Multivariate modeling showed that African Americans have, on average, almost 2 points greater chronic pain severity than whites ($\beta = 1.87$, $p = 0.01$). In repeated measures analysis, neither regional nerve blocks or intraoperative ketamine had a significant effect on chronic pain severity after controlling for age, gender, and race.

Conclusion: Nearly 50% of patients undergoing ORIF experience chronic pain. While this estimate nears estimates for orthopedic surgeries overall,⁷ one should question whether post-ORIF pain is being adequately controlled—specifically for African Americans who are at greater risk. Furthermore, current perioperative analgesic strategies may not be effective at reducing chronic pain. Future work will assess opioid utilization and other perioperative factors (e.g. fracture site) that may influence chronic pain development, and rates of chronic opioid use following ORIF.

Importance: Innovative perioperative analgesic strategies are urgently needed to reduce chronic pain in patients undergoing ORIF and to promote more equitable pain control across demographics.

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Data Sources and the Potential for Bias for Clinical T₁ Renal Masses

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Background: The rising incidence of kidney cancer and the development of new treatment options have led to a proliferation of comparative effectiveness research using cancer registry and administrative data. These sources offer greater accessibility and numbers, but may be subject to bias, especially since tissue confirmation prior to treatment has not been the historical standard. Thus, we compared the study populations from 3 common data sources to understand the potential impact on generalizability.

Methods: We identified new clinical T₁ renal masses suspicious for kidney cancer from January 2019–December 2020. First, we identified patients enrolled into a prospective clinical trial for clinical T₁ renal masses. Second, we extracted T₁ kidney cancer cases from the institutional cancer registry, which applies strict case criteria and submits data to the National Cancer Database (NCDB). Third, we extracted electronic health record (EHR) data using ICD₁₀ codes followed by manual review. Age, gender, race, ethnicity, insurance, marital status, socioeconomic status, geography, and Charlson comorbidity index (CCI) were compared across groups using chi-squared testing.

Results: We identified 819 clinical T₁ kidney cancer cases. 495 (60.4%) were contained within the cancer registry only, 136 (16.6%) were in the registry and clinical trial, 185 (22.6%) were identified only by chart extraction, and 3 were in the clinical trial only. Qualitatively, cases were not included into the registry due to lack of histopathology and/or failure to meet strict radiographic terminology. Cancer registry and clinical trial patients were more often male ($p=0.003$) compared to chart extraction only. Patients with higher CCI were more likely to be in the clinical trial or cancer registry ($p<0.0001$). Age, insurance, area of deprivation index, distance, geographic distribution, and marital status did not differ significantly. Race was weakly associated ($p=0.061$).

Conclusions: Cancer registry data may miss a sizeable portion of clinical cases, particularly those without tissue confirmation. Meanwhile, clinical trials face accrual challenges but can reflect the broader population depending on conduct and setting.

Importance: Research on clinical T₁ kidney cancer may be subject to bias depending on data source, which could impact generalizability. Our findings highlight the need for further research in this topic.

Establishing a peripheral artery disease screening workflow at Cherokee Indian Hospital Authority's primary care clinic

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Background: Peripheral artery disease (PAD) is estimated to impact over 8 million Americans. An ankle-brachial index (ABI) is a noninvasive measurement that is used in the detection of PAD. While PAD is very common in individuals with other cardiovascular risk factors, using an ABI test as an asymptomatic screening tool is not indicated due to harms from the overtreatment in the absence of PAD resulting from false positive results. The patients at increased risk for PAD should undergo comprehensive medical history and review of systems questions assessing for exertional leg symptoms.

Methods: We completed a literature review of current PAD screening recommendations to create a stepwise screening workflow to guide providers' clinical decision making with patients that are at high risk of developing PAD.

Results: A PAD screening should be completed if a patient is over 70 years old or is 40-69 with a cardiovascular risk factor, such as diabetes or a smoking history. If patients meet either of these criteria, review of systems (ROS) questions are asked to assess for exertional leg symptoms. If any ROS questions are positive, a lower extremity physical exam should then be completed to assess for signs of PAD. If any aspects of the physical exam are positive, an ABI is ordered. If an ABI is less than 0.7 or greater than 1.3, a patient is referred to a vascular surgeon.

Conclusion: Providers asking ROS questions is an important part of this workflow, but remembering to do so can be challenging in the context of a medical visit. The implementation of this workflow into electronic medical records could lead to more providers screening for PAD through reminders to conduct ROS questions. Such implementation could lead to workflows that allow medical assistants and nurses to include PAD ROS questions in screenings prior to preventative health visits.

Importance: Patients with PAD are less likely to receive medical therapy than other forms of cardiovascular disease. Diagnosis of PAD can potentially help identify patients who would benefit from aggressive measures for cardiovascular risk reduction, as an abnormal ABI is associated with increased 10-year mortality and overall cardiovascular mortality.

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Team STEPPS in Surgery: A Scoping Review

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Background: Communication is essential for patient safety. Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) is a recognized framework for augmenting team dynamics which has attracted interest for its potential applications to surgery. We performed a scoping review of existing literature on TeamSTEPPS in a surgical setting to identify gaps and inform future directions of study.

Methods: We conducted a comprehensive PubMed search to identify relevant studies published after January 2012. Our search combined keywords related to “TeamSTEPPS,” “surgery,” and “teamwork.” Eligible studies examined TeamSTEPPS implementation and impact on inpatient surgical settings using explicit evaluation tools with clearly defined pre- and post-intervention endpoints. Covidence was used for abstract and full text review; studies meeting eligibility criteria were analyzed to identify themes, outcomes, and gaps.

Results: Of 603 studies, 19 met our inclusion criteria: 9 pre-post study design articles, 3 retrospective reviews, 3 qualitative descriptive articles, 2 quasi-experimental articles, and 2 mixed methods studies. Overall, these studies demonstrated that TeamSTEPPS improves communication among healthcare teams, increases OR efficiency, and enhances patient safety. Empirical evidence confirms the effectiveness of TeamSTEPPS, underscoring its impact both on team dynamics and healthcare outcomes. However, studies found the implementation of TeamSTEPPS relies upon program leadership support and continuous team training.

Conclusion: The literature demonstrates that TeamSTEPPS implementation leads to improvements in patient safety, communication, and efficiency in a surgical setting. The major limitation identified by studies is the sustainability of interventions; therefore, future research should focus on addressing implementation barriers and general sustainability.

Factors Influencing Brace Compliance in Clubfoot Patients Treated with the Ponseti Method at UNC

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Background: Clubfoot, or talipes equinovarus, is a common congenital deformity characterized by abnormal plantar flexion and hindfoot varus. The Ponseti method, involving serial casting, tenotomy, and bracing, is the gold standard treatment with high success rates^{2,4,5}. However, 30-60% of patients exhibit noncompliance with required post-correction bracing, which is strongly associated with recurrence⁶. Parental brace compliance is crucial as infants rely on their caregivers^{1,3}. This exploratory study aimed to uncover which social and demographic factors influence brace adherence at UNC Chapel Hill.

Methods: A retrospective analysis examined medical records of idiopathic clubfoot patients treated solely with the Ponseti method at UNC from 2013-2022. Data on clinical, socioeconomic, and demographic factors were extracted. Chi-squared tests and correlation analyses determined associations between variables and brace compliance.

Results: Of 84 patients, 23.81% exhibited brace noncompliance. Noncompliance was associated with significantly higher rates of deformity recurrence (80% vs 4.69%, $p < 0.001$). Income and race correlated with compliance rates. Patients from lower income status (derived from zip code) and racial minorities had reduced compliance ($p < 0.05$). Distance from UNC, gender, and language did not impact compliance. Clinical features such as presence of prenatal screening, bilaterality, and treatment strategy were controlled for.

Conclusion: Brace noncompliance among clubfoot patients is associated with higher recurrence rates¹. Socioeconomic factors like income and race significantly influence brace adherence, highlighting the role of social determinants of health in treatment outcomes. Further research is needed with a larger and more diverse cohort to validate and expand upon these findings with qualitative data. Targeted interventions should address barriers to compliance.

Importance: Understanding factors that affect brace compliance can optimize and tailor treatment strategies thereby reducing clubfoot relapse rates.

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Investigating Patterns of First-Line Treatment Failure in Patients with De Novo Metastatic Breast Cancer

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Background: 6-10% of breast cancer patients will present with metastatic disease, along with intact primary breast tumor, a condition known as de novo metastatic breast cancer (dnMBC).^{1,3} Patients with dnMBC are a particularly important population to study, as the prevalence of dnMBC continues to rise and approach that of recurrent metastatic breast cancer. The proposed study seeks to investigate patterns of treatment failure in patients with dnMBC treated with first line systemic therapy. Further, the study will analyze patterns of treatment failure and time to disease progression by receptor status given the vastly different clinical phenotypes of each subtype.

Methods: A retrospective cohort study including patients with de novo metastatic breast cancer (N = 326) from the UNC Metastatic Breast Cancer Database (PI: Lisa Carey). Subsequent imaging and notes were reviewed in EPIC, during which data was collected regarding the date and site of first progression. Statistical cumulative incidence functions were utilized to assess time to first treatment failure by receptor phenotype.

Results: Data was obtained from 326 patients with dnMBC (322 female, 4 male). The receptor status of the primary breast tumor was predominantly luminal A (48.2%), followed by basal/TN (20.2%), luminal B (13.2%), and HER2+/ER- (10.1%). The cohort of patients had a median time to first progression of approximately 1.3 years. This time was significantly decreased to approximately 5 months in patients with basal/TN dnMBC, which is consistent with prior literature. The site of first progression in patients with dnMBC was most frequently a preexisting metastatic site (24.2%), followed closely by a new metastatic site (20.9%).

Conclusion: Focusing efforts of first-line treatment on pre-existing metastatic sites may improve both progression-free and overall survival for patients with dnMBC. Future research should investigate the effectiveness of various treatment modalities in reducing time to first progression.

Importance: Breast cancer is the most common cancer diagnosed in women and the second leading cause of cancer-related death, making it an important target for efforts to maximize the effectiveness of first line and adjuvant therapies.^{1,2}

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An Exploratory Analysis of ChatGPT Compared to Human Performance with the Anesthesiology Oral Board Exam: Initial Insights and Implications

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Background: Chat Generative Pre-Trained Transformer (ChatGPT) has been tested and has passed various high-level exams. However, it has not been tested on an exam such as the American Board of Anesthesiology (ABA) Standardized Oral Examination (SOE). The SOE is designed to assess higher-level competencies, such as judgment, organization, adaptability to unexpected clinical changes, and presentation of information.^{1,2,3}

Methods: Four anesthesiology fellows took two retired ABA SOEs. Their answers were compared to those produced by the same questions asked to ChatGPT. All human and ChatGPT responses were transcribed, randomized by module, then produced as complete exams, utilizing a commercially available software based human voice replicator. Eight ABA applied examiners listened to one of four versions of each of the two exams. Each exam was scored as the standard ABA SOE for each topic and module.

Results: The anesthesiology fellow's answers were found to have a better median score than ChatGPT, for the module topics scores ($p=0.03$). However, there was no significant difference in the median overall global module scores between the human and ChatGPT responses

($P=0.17$). The examiners were able to identify the ChatGPT-generated answers for 23 of 24 modules (95.83%), with only one ChatGPT response perceived as from a human. In contrast, the examiners' thought the human (fellow) responses were AI generated for 14 of 24 modules (58.33%).

Examiner comments also explained that ChatGPT generated relevant content, but lengthy answers, which at times did not focus on the specific scenario priorities. There were no comments from the examiners regarding Chat GPT fact “hallucinations.”

Conclusion: Future curation of ChatGPT answers, more in line with ideal ABA SOE answer format, could lead to a higher performance and an anesthesiology-specific trained AI to use for Anesthesiologist SOE preparation.

Importance: This work demonstrates the potential of ChatGPT to provide broader access to examination preparation material for Anesthesiology residents across the United States.

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A Review: Evaluating Bony Predictors of Bite Force Across the Order Carnivora

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Background: Exploring the fundamental concept of bite force in a mammalian feeding system, our paper focused on the diverse order of Carnivora. To assess the efficacy of bite force estimations for paleontological dietary niche diversification studies, we investigated volumetric and attach-site derived osteologic bite force estimation methods including direct myologic, 2D photographic, and the “Thomason’s dry skull method.” However, we concentrated on modernizing osteological techniques through 3D surface scanning to improve bite force estimation capabilities.

Methods: Data collection was a multi-stage process involving 40 specimens of the order Carnivora, with 8 families represented (Canidae, Felidae, Hyaenidae, Herpestidae, Mustelidae, Procyonidae, Mephitidae, and Ursidae). Major steps included dissection for myologic data acquisition, as well as photography and 3-D surface scan model creation of the cranium and mandibles to compare osteological values.

Results: Final data included 40 specimens. Bony correlates excluding body mass predicted muscle mass better than PCSA ($r^2=.75-.91$ vs $r^2=.65-.84$). Muscle mass of temporalis + masseter best predicted by Thomason’s “dry skull” technique ($r^2=.63$ and $.51$). PCSA of temporalis + masseter is similar between Thomason and 3D origin ($r^2=.27$ and $.18$ vs $r^2=.32$ and $.09$). Muscle attachment areas showed similar results predicting muscle mass ($r^2=.54-.56$), excluding 2D masseter origin which was less predictive ($r^2=.14$); this was synonymous for PCSA. Temporalis was most correlated with 3D origin area for both mass + PCSA ($r^2=.30$ and $.09$). Temporalis 2D-origin and 3D insertion were similar. Muscle areas with broad fibrinous entheses were more predictive than tendinous attachments for 2D and 3D.

Conclusion: Our findings showcase that 3D techniques outperform 2D photographs in predicting muscle size, yet when compared to osteological factors, muscle mass, and PCSA exhibit a stronger association with the muscle’s maximum cross-sectional area. For this reason,

muscle thickness is a critical value for bite force estimation as a larger cross-sectional area does not proportionately increase attachment site area. Ultimately, while volumetric approaches operate well across species in the order Carnivora, prudence should be practiced when applying a single method as a predictor across differing phylogenies.

Importance: Effective bite force estimation is a critical tool for effectively understanding evolutionary dietary specialization in paleontology.

Interventions to Mitigate Preterm Delivery among Black Birthing People

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Background: As compared to their White counterparts, Black birthing people (BP) in the United States are four times as likely to experience pregnancy related mortality, with one of the major causes being preterm birth. Interventions are warranted to combat this maternal mortality crisis.

Methods: Interventional studies targeting preterm delivery among Black BP were included. A systematic review of the literature from 2000 to April 2023, was performed utilizing electronic databases including PubMed, CINAHL Plus, Embase, ClinicalTrials.gov, and Scopus. Eligible studies included 100% of patients identified as Black or preterm birth was reported separately and specifically for Black participants. Data extraction focused on categorizing articles by intervention type such as (but not limited to): community programs, individual counseling, educational enhancement, etc.

Results: 28 articles were included in the analysis. Community programs like WIC and Health Start were the most reported intervention type in 14 articles (50%). Individual counseling was the second highest reported intervention appearing in 8 articles (28.6%). Medical Interventions (n=7, 25%) and Education Enhancement (n=6, 21.43%) also appeared frequently. Other interventions like policy (n=2, 7.14%) were less frequent. The largest portion of interventions focused on infant health and not the Black BP's.

Conclusion: The available literature emphasizes community programs to mitigate preterm delivery among Black BP focusing on infant health as opposed to the BP's health. While preterm delivery is a mortality risk factor in both BP and infants, the rates of Black pregnancy-related mortality are much higher than infant mortality. As well as the Black-White disparity is larger in pregnancy-related mortality. The current literature does not reflect the needs of Black BP and should become the prime objective of patient-centered outcome-focused research.

Importance: The current literature does not reflect the needs of Black BP and should become the prime objective of patient-centered outcome-focused research.

Evaluating Generalized Joint Hypermobility as a Potential Risk Factor for Increased Injury in Division I Athletes – A Prospective Cohort Study

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Background: Joint hypermobility is supranormal motion in multiple joints. The Beighton score classification incorporates a 9-point physical exam tool with ≥ 4 points meeting criteria for hypermobility. Kirk et al. introduced the term generalized joint hyperlaxity (GJH) and established an association between the condition and articular pain.

This study aimed to evaluate the association of GJH as a predisposing risk factor for injury in a D_I collegiate athlete across multiple sports. We hypothesized there is no statistically significant difference in injury rates between GJH and non-GJH athletes.

Methods: D_I athletes registered with the athletic department and presented for their preseason physical were included. Athletes with preexisting injury precluding exam participation and missing demographic/injury data in the record system were excluded.

Measurements were made according to the scoring system described by Beighton et al. Consistent with the Beighton score criteria, bilateral measurements were each attributed one point for each side. Each athlete's chart was reassessed for musculoskeletal (MSK) complaints, number of injuries, athletic trainer treatments and days unavailable from practice or gameplay, and number of surgeries one year after the preseason physical date.

Results: 351 D_I athletes met inclusion criteria for this study. The mean Beighton score reported across all athletes was 2.61 ± 2.11 . During preseason physical examination, 104 individuals were found to have GJH with a mean Beighton score of 5.93 ± 1.56 . 683 total injuries were recorded in all athletes. At 1 year, there was no statistically significant difference in number of injuries, treatment episodes, or days away from play.

Conclusion: This study provides literature demonstrating D_I athletes with GJH are not at an increased risk for injury. In addition, our study showed that athletes with hypermobility have no increased risk for missed days, treatments, or surgeries for when compared to their peers without hypermobility. Future studies evaluating injury rates over an athlete's entire collegiate career may further highlight the relationship between GJH and injury rates.

Importance: GJH is not associated with increased number of injuries, treatment days, or time removed from play in this cohort of D_I athletes.

Identifying Factors Influencing Anesthesiology Residents' Self-Evaluation of ACGME Core Competencies

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Background: To determine whether there was a statistically significant difference between anesthesiology residents' self-evaluations of the Accreditation Council for Graduate Medical Education (ACGME) core competencies and evaluations completed by faculty anesthesiologists at UNC Medical Center from 2015-2021, and whether this was influenced by race and gender.

Methods: A difference score was calculated from the Clinical Competency Committee (CCC) scores and the Self-Assessment (SA) scores (CCC- SA). Using Wilcoxon Two-Sample Tests for statistical analysis, we analyzed 360 anesthesiology resident data points at UNC Medical Center from 2015-2021 from Clinical Anesthesia (CA)-1 year to CA-3 year of their residency training.

Results: For race, significant differences between white and non-white residents include milestones for Patient Care (PC)_{I-2}: p-value (p)=0.0469, p=0.0242), Medical Knowledge (MK)_I: p=0.0379 where non-whites overrated themselves in comparison to whites. For gender, male residents demonstrated significant differences between female residents where they overrated themselves in comparison to females for milestones PC₅: p=0.0073, PC₇₋₁₀: (p=0.011, p=0.0123, p=0.0109, p=0.0041), PBLI₂₋₃: (p=0.0406, p=0.0012), Professionalism (Prof)_{I-3}: (p=0.016, p=0.053, p=0.0281), Prof 5: p=0.0004, and Interpersonal and Communication Skills (ICS)_I: p=0.0371.”

Conclusion: Imposter syndrome could potentially contribute to the associations reflected in this study between residents' milestone SA scores and CCC scores based on race and gender. Residency programs could potentially provide additional education on the expected levels of milestone competency for both faculty and residents throughout residency training. Feedback training for faculty may need to be provided to adjust their norms for providing feedback to anesthesiology residents throughout residency training and biannual ACGME competency evaluation meetings.

Clinical Indications for Rapid Sequence MRI in Pediatric Patients and the Limitations and Barriers to Implementation

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Background: Computed Tomography (CT) has been the first-line choice for imaging studies in screening for and monitoring neurologic pathology, though concerns for radiation exposure levels from CT scans in the pediatric population increase the need for alternative imaging methods. Standard MRI, though effective in eliminating ionizing radiation exposure, usually requires sedation in children for an imaging scan with effective motion-artifact reduction. With the growing concerns surrounding radiation and sedation exposure in pediatric patients, this project explores clinical use of Rapid Sequence MRIs (RS-MRI).

Methods: This project utilized a systematic literature review to analyze the clinical indications of RS-MRI and where it can serve as substitute or adjuvant in diagnostic workup of neuropathology. Also investigated and outlined were the limitations and logistical barriers to implementation of transitioning from traditional CT and standard MRIs toward RS-MRI protocols.

Results: When assessing performance, RS-MRI is comparable to traditional imaging studies in diagnosing shunt malfunction, syrinx, and extra-axial hemorrhage. RS-MRI with GRE is most sensitive for detecting intracranial hemorrhages when prior CT is available and is not adequate to replace CT in the initial evaluation. Barriers to implementation of RS-MRI protocols include higher patient costs compared to CT, lack of standardized protocols for RS-MRI across different hospitals, and lack of sensitivity for Traumatic Brain Injury findings.

Conclusion: RS-MRI offers an alternative imaging diagnostic tool in pediatric patients by using T2 weighted sequences to visualize cranial and spinal pathologies, with faster scan times than traditional neuroimaging modalities, reduced ionizing radiation and reduced sedation exposure, however, there are practical limitations and barriers to complete transition of RS-MRI in the clinical setting.

Importance: RS-MRI protocols are a great way to reduce ionizing radiation and sedation in children. These findings elucidate the hurdles to overcome when transitioning to using them clinically.

Perspectives of Black women with breast cancer on their treatment decision-making experience

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Background: Disproportionately high breast cancer mortality rates among Black women in the U.S. are partly due to poor access to high-quality cancer care. Effective patient-physician communication is a key determinant of high-quality care. We sought to understand the quality of clinician-communicated information about breast cancer treatments among Black women treated for breast cancer.

Methods: Semi-structured interviews lasting 45-60 minutes were conducted from May to September 2022 with 20 selected Black women undergoing breast cancer care in North Carolina. Participants were recruited to understand clinical trial information and communication needs of Black women with breast cancer. Interviews were digitally recorded, transcribed verbatim, and analyzed using thematic analysis.

Results: Participants were generally satisfied with their treatment decision-making experience, but several expressed the need for better communication about the risks and benefits of breast cancer treatment options, sequence of treatment modalities, and side effects specifically experienced by African Americans. One participant felt inadequately informed about her treatment options: *"No one ever told me that if I had the total breast removed, I may not have to do radiation."* Another regretted timing for breast reconstruction: *"If I had known that was probably better long term, I would've chose that a hundred times over and over again, but I didn't know."* Some wished clinicians were more informed about skin-tone-specific side effects: *"...even she [clinician] says like, well, that's a little strange that your skin's discoloring a little bit. It makes me a little uneasy because, it's kinda like, well, she probably doesn't know because, well, she might not have done a lot of studying African American skin."*

Conclusion: Informational needs about breast cancer treatment options and side effects were unmet for some Black women who received breast cancer treatment despite general satisfaction with their treatment decision-making experience. Future research will explore the use of a person-centered and culturally responsive mobile health app designed to help close the treatment information gap Black women with breast cancer experience.

Importance: Disparities in breast cancer mortality rates among Black women in the US warrant attention. These findings highlight unmet communication needs among Black patients receiving breast cancer care.

Finite Element Analysis of an ACL Reconstructed Knee

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Background: The Anterior Cruciate Ligament (ACL) tear is one of the most common orthopedic injuries, with more than 100,000 reconstruction surgeries occurring annually in the U.S.A. alone. Unfortunately, 13% of all ACL reconstruction surgeries fail, frequently at the point of attachment. While there are numerous reconstructive graft and fixation options, many surgeries involve fastening a bone-patellar tendon-bone graft to the host bone via a screw. The intense stress placed on the bone plug - screw - host bone interface throughout rehabilitation can cause graft failure, rendering the surgery useless.

Methods: A finite element analysis model of the interface was created in Abaqus. A Holzapfel-Gasser-Ogden constitutive model represented the patellar tendon in the reconstructed knee, the bone and the metallic screw were governed with linear, elastic, isotropic, homogeneous material following previous models, and the geometry and loading profile of forces were derived from prior physiological studies. Loading profiles of rehabilitation exercises were placed on the model by changing the peak loading profile on the tendon to calculate the resultant von mises stress (also known as maximum distortion energy theory of failure stress) in the bone plug to provide probability of point of attachment failure.

Results: Plyometric exercises and aerobic exercises induced significantly more stress than weight bearing exercises and non-weight bearing exercises. The exercises that provided most to least stress are as follows: decelerating, level ground walking, dynamic seated knee extension (DSKE) with weight, double foot landing, standing, single leg squat, DSKE without weight, squat incorrect form, bicycling, squat correct form, and wall squat. The risk of graft failure is exponentially reduced with modeled healing time. Increased knee flexion angle decreased resultant stress in the bone plug throughout the range of 0 to 90 degrees. Through comparison of exercises that were repeated with a change of variables, the importance of technique and weight applied is highlighted.

Conclusion: The project provided numerical risk comparisons of common rehabilitation exercises and unique analyses of these loading profiles for variations within exercises.

Importance: This model provides other opportunities to readily test various other parameters of the reconstructed knee for future studies.

Increasing Parental Awareness of American Academy of Pediatrics Guideline-based Feeding Transitions in Children 4 months to 3 years old during Clinical Well-Child Checks in Wilmington, NC

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Background: Proper nutrition is essential to the development of all infants. The American Academy of Pediatrics (AAP) has established age-specific nutrient recommendations for infant feeding that align with physiologic development. Yet, many parents are unaware of current AAP guidelines concerning age-based feeding transitions. This is apparent for parents presenting with their infants for well-child checks (WCCs) at the MedNorth outpatient health clinic in Wilmington, NC. This population largely serves uninsured, underinsured, and immigrant patients with limited knowledge of American-based feeding guidelines. A lack of knowledge regarding proper infant nutrition is associated with adverse medical outcomes such as malnutrition and suboptimal growth. Therefore, the aim of this quality improvement project was to increase parental awareness about AAP guideline-based feeding transitions by 20% using pre- and post-intervention surveys over 4 weeks at WCCs for children aged 4 months to 3 years old.

Methods: Pre- and post-intervention nutrition surveys were drafted using the Likert scale to quantify responses to factual nutrition statements published by the AAP. Surveys were administered to patients before and after a given WCC. During the WCC, education was given regarding AAP age-based feeding recommendations using one of two handouts. The change in parental response accuracy from pre- to post-intervention surveys was quantified to compare the effectiveness between the two educational handouts.

Results: The results indicate that the educational handout from PDSA cycle 1 was effective at increasing parental awareness (ie, by >20%) of AAP guidelines specific to recommendations regarding milk alternatives and milk transitions for infants.

Conclusion: Parents presenting with their children for WCCs at our clinic may benefit from education specific to milk products and milk transitions by infant age. Parents may also benefit from receiving the educational handout used in PDSA cycle 1 at subsequent WCCs.

Importance: These findings highlight the importance of (1) screening for use of milk alternatives and (2) emphasizing milk transitions during WCCs conducted at the MedNorth health clinic in Wilmington, NC.

The Intoxicating Pathway from Incentive Saliency to Cardiovascular Dysfunction

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Background: Excessive alcohol consumption (AC) is a risk factor for cardiovascular dysfunction (CD). Incentive saliency (IS), the process in which drug-related cues are imbued with motivational saliency due to changes in brain reward circuitry, is one of the neurofunctional domains in the Addictions Neuroclinical Assessment (ANA) thought to underlie Alcohol Use Disorder. Our study seeks to examine if AC mediates the relationship between IS and the development of CD.

Methods: Participants (N = 300; 41% female) with a wide range of alcohol consumption behaviors completed the NIAAA natural history protocol and the ANA battery. Factor analyses were conducted to identify the latent factors of the IS and CD domains. Structural equation modeling was used to model the direct and indirect relationships between IS, AC, and CD. Smoking status and sex were included as covariates.

Results: A two-factor structure of IS provide the best fit to the data. Those two factors were alcohol motivation (AM) and alcohol insensitivity (AI). The relationship between AM and CD was mediated by AC (indirect effect=0.28, $p<0.001$). Although a lower effect was observed, the relationship between AI and CD was also mediated by AC (indirect effect=0.1, $p<0.001$).

Conclusion: Our results highlight the contribution of IS in the development of CD as a result of problematic drinking.

Importance: These findings can help inform clinical management of CD by way of heavy alcohol consumption. In the future we will direct our attention towards the pathological effects AC may have on metabolic and neuroendocrine systems.

Evaluating applications of lower extremity ultrasound for muscle function assessment in older adults

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Background: Current modalities of muscle quality and function assessment in older adults are time consuming, expensive, and cumbersome to perform. Increased intramuscular fat and decreased muscle size are precursors to muscle function and common geriatric syndromes such as frailty and sarcopenia.(Hoogendijk et al., 2019) Ultrasound represents an objective and convenient modality of measuring intramuscular fat and muscle size.(Burton & Stock, 2018; Lv et al., 2022; Ticinesi et al., 2017)

Methods: 20 older adults were recruited from the Acute Care of the Elderly Unit at UNC Hillsborough. Exclusion criteria included cognitive impairment, positive test for COVID-19, lower extremity edema or injury, and participants without a comprehensive geriatric assessment. Informed consent and HIPPA Authorization were obtained. Participants performed a grip strength test and ambulatory participants performed a gait speed test. Trained researchers obtained muscle ultrasound images of the rectus femoris, tibialis anterior, and gastrocnemius. Muscle echogenicity and diameter were assessed using ImageJ.

Results: Results are still being collected and analyzed. We hypothesize that worse performance on commonly used muscle function tests (grip strength and gait speed) will correlate with increased intramuscular fat and decreased muscle size as measured by ultrasound. We also hypothesize that non-ambulatory participants will have increased intramuscular fat and decreased muscle size compared to ambulatory participants.

Conclusion: Assuming the stated hypotheses are supported, ultrasound can serve as a convenient, quick, economical, and objective measurement of muscle quality and function in the hospital setting. More research is required to determine if measurements of muscle function using ultrasound can be used to assess for sarcopenia and frailty.

Importance: Decreased muscle function is associated with sarcopenia and frailty which are common geriatric syndromes associated with adverse outcomes such as falls, disability, hospitalization, and mortality.(Ensrud et al., 2007; Kojima, 2017; Shamliyan et al., 2013) Bedside

POCUS may help clinicians to identify these syndromes thus allowing for earlier treatment and reduced risk for adverse outcomes.

Implementation of the Epic Deterioration Index at an academic tertiary care medical center

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Background: The Epic Deterioration Index (EDI)^{1,2} is a predictive model for stratifying risk of COVID-19 patients in non-ICU care. We aimed to evaluate clinical use and feasibility of the EDI in non-ICU patients by establishing an EDI score reviewing processes. The goal was to prompt appropriate escalation of patient care via Rapid Response teams (RRT) on the medicine step-down unit of an academic tertiary care medical center.

Methods: Our academic medical center was one of 100 US sites at which the EDI was implemented beginning in 2020. PDSA 1 involved: educating front-desk and nursing staff to review 3x per 12-hour shift and escalate care for EDI increases of ≥ 10 . Starbucks gift cards were incentives. “Time-since-reviewed” adherence was assessed daily via EMR timestamp at varying times between January and July 2022. Qualitative feedback was elicited from staff for feasibility.

Results: 31% of the time, $\geq 80\%$ of EDI scores were reviewed within 4 hours and 49% of the time within 24 hours through March. Qualitative feedback indicated that the model should be more inclusive of those reviewing the score for efficiency. Addition of RRT nurses in reviews increased the adherence from 49% to 87% by end of July.

Conclusion: Our results indicate that daily review of EDI at an academic hospital is very feasible. PDSA 2 involves an implementation trial on another unit. Limitations include only daily assessment of score review adherence and staff turnover.

Importance: Future directions include statistical validation of the generalization of EDI for non-COVID patients and multilevel staffing education on the utility of EDI.

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Updating an NLP Algorithm to Identify Care Gaps for the Transgender and Gender Diverse Populations

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Objective: To update an existing Natural Language Processing (NLP) algorithm to identify trends in EHR documentation of transgender and gender-diverse (TGD) patients, while attempting to account for current sociopolitical barriers the TGD community faces.

Methods: Secondary data was collected from UNC's Gender-Affirming Primary Care Clinic patient panel. Patient charts were manually reviewed and categorized by billing code and EPIC SOGI (sexual orientation and gender identity) data. The algorithm was then adjusted and ran using EMERSE software to tailor a more accurate catchment of the entire patient panel. With each iteration of adjusted algorithm, the data set was analyzed for trends.

Results: Using an updated and expanded list of ICD-10 billing codes and keywords, we captured 99% (189/191) of the given patient list. 72% (128/190) of patients' gender identity was correctly documented in the SOGI section of EPIC. Of the 191 TGD patients identified, 15 (8%) were uninsured, 25 (13%) were insured through UNC's Financial Assistance Program. Patients with State Health Plan were more likely to secure healthcare using the E34.9 billing code. Patients utilized the Family Medicine Clinic most (99%), but also sought care from Plastic Surgery, Psychiatry, Urology, Gynecology, Pediatric Endocrinology, Endocrinology, Oral & Maxillofacial Surgery, and Emergency Medicine.

Conclusion: When capturing a strategically hidden population in a rough sociopolitical climate, the healthcare workers providing gender-affirming care have the best insight. By expanding and updating this algorithm, the care needed by this marginalized population continues to grow clearer.

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Assessing the Experiences of Transgender and Nonbinary Patients in a Family Medicine Residency Clinic

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Background: Transgender and nonbinary (TGNB) patients face significant health disparities and frequent negative healthcare-related experiences. UNC's residency-based Family Medicine Center (FMC) provides care for an increasing number of TGNB patients. Providing comprehensive, affirming care for TGNB patients requires a clear understanding of their experiences, needs, and perspectives. However, few avenues exist for TGNB patients to share this essential information with healthcare practitioners.

Methods: We distributed a multiple-choice and free-text survey on healthcare experiences to all TGNB-identifying patients currently receiving care at the FMC. We then conducted four semi-structured focus groups with a subset of participants. We developed an initial codebook based on a collective review of free-text survey responses and current literature, which two investigators used for thematic coding of focus group transcripts. We collectively reviewed these coded data to identify emergent patterns and salient themes.

Results: 90 participants completed the survey, and 20 participated in focus groups. Our kappa statistic of 0.80 reflects excellent inter-coder reliability. Positive experiences included being accurately gendered, receiving appropriate anatomy-specific care, and seeing LGBTQ-friendly signage around the FMC, which made participants feel safe, heard, and comfortable. Negative experiences including being misgendered, inadvertently "outed," or asked unnecessary or invasive questions, which made participants feel uncomfortable, invisible, and unsafe.

Conclusion: Providing comprehensive, affirming care for TGNB patients involves respect for gender identity, knowledge of gender-affirming care, and genuine investment in patient wellbeing. This project's emerging themes invite specific interpersonal and structural interventions to improve the care of TGNB patients at the FMC and beyond.

Importance: Gender affirming care continues to be an area of growth at the FMC and across the nation. These findings and associated recommendations emphasize the need for further interventions and research to improve TGNB care.

Developing a Readability Enhanced Sinonasal Outcome Test

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Background: Patient-reported outcome measures (PROMs) are used to assess the subjective impact of disease. The 22-item Sinonasal Outcome Test (SNOT-22) is a validated PROM for use in patients with chronic rhinosinusitis (CRS) and allergic rhinitis (AR) (Hopkins et al., 2009; Husain et al., 2020). However, the SNOT-22 is significantly above the 6th-grade reading level recommended by the American Medical Association (B.D. Weiss, 2003; Lee et al., 2020).

Methods: The SNOT-22 was analyzed with three validated metrics to assess reading levels of each question. Several alternate synonymous questions were developed for the questions above a 6th-grade reading level. Patients were surveyed on which alternates they preferred, and the final alternates were combined with the unchanged SNOT-22 questions to develop the Readability Enhanced Sinonasal Outcome Test (reSNOT-22). The SNOT-22 and reSNOT-22 were given to patients in UNC rhinology clinics. Statistical analysis was performed using GraphPad Prism 10.

Results: The SNOT-22 and reSNOT-22 were administered to 299 patients. When compared, the total scores of the surveys were highly correlated ($r=0.9755$). There was no significant difference between the two scores ($p=0.1246$, 95% CI -0.9904 , 0.1208). All seven questions (Q₂, Q₉, Q₁₃, Q₁₇, Q₁₈, Q₁₉, Q₂₀) that were changed remained highly correlated with r values > 0.83 . Questions 2, 17, 18, and 20 had significantly different scores with p -values of $p=0.0196$, $p<0.0001$, $p<0.0001$, $p<0.0001$, respectively.

Conclusion: The SNOT-22 and reSNOT-22 were administered to 299 patients. When compared, the total scores of the surveys were highly correlated ($r=0.9755$). There was no significant difference between the two scores ($p=0.1246$, 95% CI -0.9904 , 0.1208). All seven questions (Q₂, Q₉, Q₁₃, Q₁₇, Q₁₈, Q₁₉, Q₂₀) that were changed remained highly correlated with r values > 0.82 . Questions 2, 17, 18, and 20 had significantly different scores with p -values of $p=0.0196$, $p<0.0001$, $p<0.0001$, $p<0.0001$, respectively.

Importance: Ensuring patient materials are appropriate reading level is of utmost importance, as it has been shown that those with limited health literacy have worse quality of life outcomes compared to those with adequate health literacy (B.D. Weiss, 2003; Lee et al., 2020).

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Comparison of CT and wide-angle stationary digital chest tomosynthesis in the detection of pulmonary nodules

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Background: Lung cancer remains the number one cause of cancer death. Screening remains underutilized despite the clear evidence of benefit. A need exists for a safe, mobile, low radiation dose, intra-procedural method to localize biopsy instruments within target nodules. This retrospective cross sectional reader feasibility study evaluates the ability of clinicians to identify pulmonary nodules using a wide-angle stationary digital chest tomosynthesis system.

Methods: A “LUNGMAN” phantom was scanned by both CT and tomosynthesis. For each of the 8 nodule test cases, 3 nodules of variable size and radiodensity were randomly placed into the phantom. CT scanning was performed under the ACR lung cancer screening protocol. Chest tomosynthesis imaging was performed with a custom built “wide-angle” CNT system consisting of a meter long x-ray source with 60 independent activated x-ray sources opposite a digital detector, representing a 40-degree angular span. Imaging was performed at 120kV and 2.358 mAs. Tomosynthesis images were reconstructed into the coronal plane with 3-mm slice thickness and presented to two board certified radiologists. Each scan (CT vs tomosynthesis) was independently reviewed, and the positions of lung nodules were documented by each reader.

Results: The specificity of CT and tomosynthesis in detecting any sized pulmonary nodules was 1. For actionable pulmonary nodules, or those 8-mm or greater in size, both the CT and tomosynthesis had a specificity of 1. The sensitivity of CT and tomosynthesis in detecting any sized pulmonary nodules is 0.929 and 0.708, respectively. The sensitivity of CT and tomosynthesis in detecting actionable pulmonary nodules is 0.958 and 0.850, respectively. The sensitivity of tomosynthesis increases with dense pulmonary nodules, with actionable pulmonary nodules of HU+130 being detected with a sensitivity of 1.

Conclusion: Tomosynthesis was found to consistently identify dense nodules of at least 8-mm in size. With system and carbon nanotube array optimization, we hypothesize the detection rate for nodules will improve. Additional study is needed to evaluate its use in target and tool co-localization and target biopsy.

Importance: An effective, low-radiation and mobile method for pulmonary nodules could improve screening of lung cancer.