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Focal ischemic stroke is the leading cause of functional disability and the second cause of death worldwide. Every year, more than 795,000 people in the United States have a stroke. About 87% of all strokes are ischemic strokes. During an ischemic brain injury, a blood vessel that supplies a brain region is occluded which leads to the deprivation of the oxygen and glucose supply to the brain, causing cell death. The damaged neurons release a number of inflammatory cytokines that can exacerbate the damage. One of those cytokines is lipocalin-2 (LCN2), which is an inflammation-signaling protein released by different cells. Intracellular LCN2 has been shown to have a chelation effect on iron which may lead to apoptosis. My mentors, Dr. Dempsey and Wesley have recently identified LCN2 is upregulated in the neuronal cells of aged and stroke-induced rat brains. LCN2 has also been detected in the plasma of stroke patients. Together, these results suggest an important role for LCN2 in stroke pathology.

MicroRNAs are noncoding RNA sequence that play a crucial role in post-transcriptional gene expression. MicroRNA-138 has been shown to regulate the expression of LCN2 through post-transcriptional silencing. Our lab has identified two novel miRNAs (miR125a and miR383) that overlap with the 3’ UTR of the LCN2 gene, suggesting that these microRNAs may target LCN2 for degradation. My mentors also have identified an inverse correlation between these miRNAs and LCN2 expression.

In this project, a luciferase assay was used to study the effect of miR-125a and miR-383 on the expression of LCN2. The 3’UTR of LCN2 was incorporated at the 3’ end of a luciferase gene in a dual-luciferase plasmid. This plasmid along with the microRNAs were co-transfected into rat neuronal cells (B35). The dual-luciferase assay showed 20% and 35% reduction in luciferase expression in presence of miR-125a and miR-383, respectively, when compared to the negative control. These results indicate that miR-125a and miR-383 potentially regulate the expression of LCN2 and warrant further investigation in vivo.
POSTER 2

TITLE: Impact of preoperative quadratus lumborum block on recovery profile after ventral hernia repair.

NAME: Kristin Bevil, MD, Hubert Cios, MD, Justin Angles, MS2

BACKGROUND: Pain control is an important factor in perioperative treatment plans. Poorly managed acute postoperative pain can lead to complications, prolonged rehabilitation, development of chronic pain, and an overall decreased quality of life. Thousands of patients undergo ventral hernia surgery each year. Quadratus lumborum blocks (QLB) are a relatively new approach for providing analgesia to the abdominal wall and their efficacy has not been evaluated for ventral hernia surgery. QLB may provide better pain control and reduced opioid consumption following laparoscopic ventral hernia repair surgery compared to standard medical management.

OBJECTIVE: This study aims to evaluate the efficacy of the QLB in reducing pain, opioid consumption, and time to discharge postoperatively versus standard medical management.

METHODS: This is an IRB approved, prospective, single-center, randomized trial of 48 subjects undergoing elective laparoscopic ventral hernia repair at UW at The American Center (TAC). Subjects are randomized to receive either preoperative QLB or standard medical management for pain control. Assessment for pain, opiate consumption, nausea, and location of most severe pain are gathered immediately in PACU, and on days 1, 2, and 7 postoperatively.

RESULTS: This study is currently ongoing. To date, 10 participants have been recruited and preliminary data is not yet available. Patient recruitment has been difficult due to strict exclusion criteria. Repair of multiple ventral hernias, repair of recurrent ventral hernia, and patient declination have been the most prevalent exclusion criteria. Multiple and recurrent hernias were excluded because they may be more complex surgeries that would be associated with more severe postoperative pain. Of the 10 participants that have been recruited, there have been little to no difficulties in obtaining the postoperative data.

CONCLUSIONS: Moving forward in the study it will be important to continue screening every potential patient in order to maximize study participation. The high volume of recurrent and multiple hernia repairs limits participation in this study but warrants the possibility for future research on the impact of preoperative QLB on these unique and prevalent patient populations. Opioid reduction solutions are a priority in postoperative analgesia and are more important now than ever as the US opioid epidemic continues to become increasingly problematic.
POSTER 3

TITLE: Quality of Life Impact from Unilateral Vocal Fold Paralysis due to Thyroid Surgery

NAME: Kathy Bach

BACKGROUND: Thyroid cancer has seen an increase in incidence by three-fold in just three decades, though its mortality rate has remained stable. Thyroidectomy, a surgery with a multitude of risks, is the most common treatment for this rarely lethal cancer. No study to date has prospectively examined the differences in quality of life burden of patients with unilateral vocal fold paralysis (UVFP), a complication which occurs in 2-8% of thyroidectomies, and patients without UVFP complications.

OBJECTIVE: This qualitative study is part of a mixed methods research program designed to examine patient quality of life post-thyroidectomy. A prospective, case control study was performed to compare patients’ psychological, social, and physical quality of life between patient experiences with and without post-thyroidectomy UVFP complication.

METHODS: Consenting adults (N=57) with a new diagnosis of thyroid cancer were interviewed pre-operatively and at 2 weeks, 6 weeks, 6 months, and 12 months post-operatively. Patients (n=7) with confirmed post-operative UVFP were matched on age, race, gender, and surgical type with patients (n=7) who did not experience any major surgical complications. Directed content analysis was utilized in analysis to determine if or when the experiences of patients with a UVFP complication converged with the experiences of patients without.

RESULTS: Patients with UVFP post-thyroidectomy self-report significantly higher short-term psychological and social burden and experience poorer health outcomes specific to voice and swallowing problems than those without complication.

CONCLUSION: UVFP causes significant psychological, social, and physical quality of life burden for thyroid cancer patients who generally experience very low mortality rates. These findings will better equip surgeons pursuing thyroidectomy for newly diagnosed cancer patients to preoperatively counsel candidates on UVFP complication, its short-term quality of life burdens, and expected health outcomes.
COORDINATED CALCIUM DYNAMICS OF MOTILE EOSINOPHILS

Karina Teresa T. Barretto
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UW School of Medicine and Public Health, Department of Biomolecular Chemistry

Background: Eosinophils (EOS) are prominent mediators and effectors of inflammation in asthma. However, many of their pathogenic mechanisms are not fully understood. We seek to elucidate potential targets for therapy by understanding how EOS migrate and extravasate into the asthmatic lung.

When activated by IL-5 family cytokines, EOS polarize and jam the nucleus to one end, forming a nucleopod. We predict that this apposition of nuclear and plasma membranes compensates for their minimized endoplasmic reticulum (ER). After utilizing ER Ca$^{2+}$ in activation, motility is dependent on extracellular Ca$^{2+}$. We hypothesize that coordinated Ca$^{2+}$ influx is mediated by interactions between ORAI Ca$^{2+}$ channel proteins in the plasma membrane and STIM sensors of ER Ca$^{2+}$ depletion in the nuclear envelope.

Objective: To characterize coordinated Ca$^{2+}$ dynamics in activating and motile eosinophils and to assess STIM and ORAI involvement in EOS migration.

Methods: To visualize Ca$^{2+}$ utilization, purified human blood EOS were dyed with Calcium Green then placed on periostin (PN). EOS activation by IL-5 or IL-33 and migration on PN were imaged under fluorescent video microscopy using a temperature and CO$_2$-controlled chamber. STIM1 and ORAI1 were localized on fixed migratory EOS using confocal microscopy and commercial antibodies.

Results: Video microscopy demonstrated nucleus-associated Ca$^{2+}$ fluorescence in unactivated EOS. Migrating EOS displayed cyclic fluorescence that moved from the nucleopod tip, between the nuclear lobes, and to the opposing granulomere. On fixed migratory EOS, STIM1 is found perinuclearly while ORAI1 is heterogeneously seen in the granulomeric region. Both proteins appear in bright puncta around the nucleus. Signals occur together and in proximity, but do not co-localize. Co-localization of STIM1 and ORAI1 is not consistent, but when seen, is found in the nucleopod tip.

Conclusions: Imaging suggests that unactivated EOS store intracellular Ca$^{2+}$ in proximity to the nucleus. We aim to investigate this relationship further, through the addition of DIC optics in video microscopy. When EOS migrate, cyclic Ca$^{2+}$ waves that are coordinated with motility are seen. Heterogeneity seen in STIM1 and ORAI1 staining on fixed migratory EOS show dynamic states of Ca$^{2+}$ regulation during motility. STIM1 and ORAI1 co-localization at the nucleopod tip hints at the role of their interaction in enabling an influx of extracellular Ca$^{2+}$ for migration.
POSTER 5

TITLE: Preoperative planning using 3D printed models for periacetabular osteotomy decreases surgical times.

NAME: Matthew A Beilfuss

BACKGROUND: Periacetabular osteotomy (PAO) is a technically challenging procedure requiring a detailed understanding of each patient’s unique pelvic anatomy; therefore, there exists a need to better assess patients’ diseased anatomy preoperatively to increase surgical efficiency, minimize complications, and promote better outcomes. Creation of three-dimensional (3D) printed pelvic models for PAO surgical planning has been described in two case studies with promising results.

OBJECTIVE: This project aims to determine the clinical feasibility and benefits of 3D modeling in surgical planning for PAO.

METHODS: This retrospective study included 21 consecutive patients who underwent PAO between January 2017 and July 2019. Of these, 14 patients (mean age=29.9 (SD 9.5), male=3) had routine preoperative CT for surgical planning, and 7 patients (mean age=25.7 (SD 6.8), male=0) had routine preoperative CT that was used to create a 3D printed model by fused deposition modeling. Orthopedic surgeons performed PAO surgical cuts on the models using surgical instruments. All patients then underwent Bernese PAO. Time required to perform the PAO, time to find proper acetabular position, time to achieve final fixation, total blood loss, and fluoroscopy radiation dose were compiled. Surgical outcome variables were compared between groups using ANOVA models controlling for age at surgery, sex, and BMI.

RESULTS: There was a significant decrease in total time of PAO (p=0.044) and time to achieve final fixation (p=0.021) in 3D printed patients relative to non-3D printed patients. There was no difference in time to proper acetabular position (p=0.105), total blood loss (p=0.1), and fluoroscopy radiation dose (p=0.174); however, we observed decreases in all three variables in 3D printed patients.

CONCLUSIONS: Surgical planning using 3D printed models for PAO is a feasible method to improve surgical efficiency by decreasing the total time of the PAO and time to achieve final fixation. Use of 3D pelvic models may also reduce time to proper acetabular position, total blood loss, and fluoroscopy radiation dose in patients. Additional work is currently being completed to determine whether 3D printing promotes optimal radiologic and patient reported outcomes.
Title: Does location of initial management after distal radius fracture impact the rate of operative reduction and fixation?

Name: Kevin Beine

Background: Fractures of the radius and/or ulna comprise the largest proportion (44%) of the estimated 1.5 million cases of hand and forearm fractures seen in United States emergency departments each year.\(^1\) Displaced distal radius fractures [DRF] are often managed with closed reduction and splinting. After initial management of these injuries, patients are referred to tertiary care facilities or specialty groups for continuing care. Failure to obtain a stable, near-anatomic reduction may lead a specialist to recommend and/or perform surgery to re-establish appropriate radiographic relationships. Surgery incurs a significant financial and physical cost to the patient and health care system.

Objective: The aim of this study was to assess how location and type of facility at which a distal radius fracture is initially managed impacts rates of surgical intervention. Specifically, we compared a tertiary care facility, staffed with hand specialists, to referring community institutions where no hand specialists were readily available.

Methods: We performed a retrospective chart review of all patients treated at University of Wisconsin - Hospital and Clinics (UW) for distal radius fractures from January 1, 2018 to December 31, 2018. Patients were placed into one of two groups: 1) initial treatment performed at any location within the UW system, 2) initial treatment performed at any location outside of the UW system. We calculated the operative rate for each group. An unpaired t-test was used to compare operative rates between the two groups.

Results: We identified 1337 patient encounters associated with a distal radius fracture current procedural terminology (CPT) code. 824 patients were initially managed at UW Health while 513 patients were initially managed at non-UW facilities. Patients initially managed at UW went on to surgical intervention at a significantly lower rate of 15.0% (n = 124) compared to those patients initially treated outside of UW Health who underwent surgery 26.3% of the time (n = 135) (p<0.0001).

Conclusions: These data suggest that initial management of distal radius fractures at UW Hospital and Clinics significantly decreases the rate of operative reduction and fixation. A decrease in operative intervention reduces both the physical and financial impact of distal radius fractures. This indicates that there may be a need to educate community providers to either perform an acceptable bony reduction or refer patients to treating facilities capable of performing these techniques in the early post-injury period.

The Use of the Métaizeau Technique for Pediatric Proximal Radius Fractures

Tom Beres

Background: Treatment of pediatric radial neck fractures poses several challenges and the prognosis of the injury is dependent on age, displacement degree, type of treatment, and associated conditions. Fractures with increased angulation and translation require opening of the radiocapitellar joint, which enhances the risk of complications such as motion loss and avascular necrosis. The Métaizeau Technique of retrograde intramedullary nailing of the radial head offers a minimally invasive method to improve stability in proximal radial fractures. This technique combines closed reduction and internal fixation with preservation of the soft-tissue attachments. Present literature yields little in identifying the key radiographic and clinical variables that could dictate the success or failure of the Métaizeau Technique.

Objective: The purpose of this study was to report the indications, complications, and outcomes of the Métaizeau Technique in pediatric proximal radius fractures. The goal was to utilize radiographs and medical records to identify clinical variables that predicted the success and failure of this technique.

Methods: A retrospective study was performed on UWHC medical charts from 2008-2018 for all children aged 6-16 with surgically managed proximal radial neck fractures. Pre-operative and post-operative radiographs were reviewed and data collected utilizing a REDCap template included: a) Degree, direction, and angle of displacement (Judet Class), b) Ipsilateral Injuries (Distal radial, Ulnar, or Olecranon Fractures; Elbow Dislocation), c) Treatment Technique (stabilization and reduction method: Closed, Percutaneous, Métaizeau, Open), d) Pre and Post-Operative Complications e) Post-Operative range of motion and Mayo Elbow Performance Score.

Results: Our cohort consisted of 332 pediatric patients with radial head and neck fractures from 2008-2018. A total of 34 patients received surgical treatment with 11 undergoing the Métaizeau technique (average age 8.8). Of the Métaizeau group, 6/11 patients were Judet Class III, 5/11 were Judet IV, and all utilized radial rods as the stabilization method. Associated injuries including olecranon fractures, elbow dislocation, and Monteggia fractures occurred in 4/11 of the Métaizeau patients. Post-Operative Mayo Performance Scores showed 8/11 Excellent (90+), 2/11 Good (75-89), and 1/11 Fair (60-74).

Conclusion: We conclude that the Métaizeau Technique offers effective and minimally invasive treatment for pediatric proximal radial neck fractures. The implementation of this technique largely depends on initial degree of fracture and ipsilateral elbow complications. Further analysis and a larger sample size are needed to determine specific risk factors in determining success or failure of the Métaizeau technique.
Title: Assessment of Barriers and Facilitators to Hand Hygiene Compliance amongst Health Care Professionals at Jimma University Specialized Hospital.

Name: Leigh Berman

Background: Lack of hand hygiene (HH) amongst health care professionals is associated with healthcare-associated infections and the spread of multi-resistant organisms. Although World Health Organization (WHO) HH guidelines have been shown to improve HH compliance in health care systems around the world, reasons for persistently low HH rates despite guideline implementation remain underexplored. We used the Systems Engineering Initiative for Patient Safety (SEIPS) framework to understand successes and challenges to the implementation of WHO HH guidelines at Jimma University Specialized Hospital (JUSH), a teaching hospital in Ethiopia.

Objective: Our qualitative study aimed to assess barriers and facilitators to HH since the implementation of WHO guidelines at JUSH and identify actionable areas for improvement.

Methods: We conducted 24 semi-structured interviews with health care professionals at JUSH in July 2019, six months after JUSH implemented WHO guidelines. Participants were selected by convenience sampling. Theoretical saturation determined participant number. The interview guide addressed HH practices, knowledge, barriers, and facilitators within the SEIPS model’s five components of the work system: tools and technology, person, organization, task, and environment. Interviews were recorded, transcribed, and coded thematically using the qualitative data analysis software QSR Nvivo (Version 12.4.0).

Results: Interviews revealed that HH training, surveillance, and practices remain minimal at JUSH. 67% of patients stated they rarely perform HH. Only 21% of participants had taken part in HH training. Only 38% knew JUSH has an Infection Prevention and Control team. Participants cited shortages of water, soap, and alcohol hand rub (100%), inadequate HH training (96%), high workload (58%), and lack of awareness (38%) as barriers to HH. The major facilitators discussed were knowledge of HH (88%), hospital patient safety culture (67%), recent increased availability of gloves and alcohol hand rub (54%), and informal HH education by superiors (38%).

Conclusions: Implementation of WHO guidelines for HH alone has not resulted in sustained HH compliance at JUSH. Results provide actionable items upon which the JUSH Infection Prevention and Control team can focus to improve HH practices and hospital norms: providing a sustainable supply of alcohol hand rub, widespread and ongoing HH trainings and reminders including posters, and enhanced HH surveillance.
Title: Radiographic Outcomes of Femur Fractures in Low- and Middle-Income Countries

Name: Zachary Birner

Background: Road traffic injury continues to rise as a cause of disability adjusted life years (DALYs) lost, and low- and middle-income countries are disproportionately affected. The Surgical Implant Generation Network (SIGN) is a non-profit organization that has developed intramedullary nailing systems to diminish the disparity seen in fracture care. While a study by Carsen et al. analyzed the rates of malalignment (>5 degrees from anatomical alignment) using the standard SIGN nail, no large-scale studies have investigated outcomes of femoral shaft fractures stabilized with the newer SIGN Fin nail.

Objectives: The purpose of this study was to retrospectively analyze if patients, treated for femur fractures using the SIGN Fin nail, had acceptably low incidences of immediate postoperative malalignment when compared to previously published literature.

Methods: The SIGN Online Surgical Database was used to identify femur shaft fractures stabilized with the SIGN Fin nail. Cases were randomized and 500 were selected that met inclusion and exclusion criteria. Fractures were classified using the AO/OTA and Winquist-Hansen classification systems. Deviation from anatomic alignment (DFAA) was measured on AP and lateral radiographs using an on-screen protractor tool. Clinical outcome variables were also analyzed including pre-surgical reduction method, time to surgery, operative time, patient age, and patient sex. Statistical analysis is ongoing.

Results: Preliminary results demonstrated an overall incidence of malalignment of 8.8%. When stratified by Winquist-Hansen classification we found an incidence of malalignment of 5.7% in class 0, 7.1% in class 1, 6.3% in class 2, 16.4% in class 3, and 50% in class 4. Rates of malalignment were higher for fractures managed with closed reduction vs. open reduction (22.5% vs. 6.2%).

Conclusion: The incidence of immediate postoperative malalignment in femur fractures treated with a SIGN Fin nail is comparable to those treated with the standard SIGN nail and is in line with large-scale studies of femoral shaft fractures treated in North American Trauma Centers. Preliminary results do not suggest any correlation between malalignment rates and fracture type. The SIGN Fin nail seems to be an excellent implant for fixation of femoral shaft fractures in resource-limited regions. Further research is required to investigate long-term clinical outcomes for the SIGN Fin nail.
POSTER 10

TITLE: Versican Proteolysis in Endometrial Cancer

NAME: Kristen Bischel

BACKGROUND: Endometrial cancer exhibits differential immunogenicity across molecular subtypes. Specifically, mismatch repair (MMR) deficiency in a subset of endometrial cancers increases mutational load, potentially leading to improved detection of tumor neoantigens within this context. The tumor microenvironment also modulates the immune response to neoantigens. The extracellular matrix protein versican (VCAN) acts as an immunosuppressive molecule that is overexpressed in cancer while its cleavage product, versikine (V-kine), is immunostimulatory.

OBJECTIVE: The objective of this study is to examine the relationship between VCAN proteolysis and CD8+ T cell tumor infiltration in endometrial cancer.

METHODS: An endometrial cancer tissue microarray (TMA) was made through the UW Carbone Cancer Center Biobank. The TMA contains tumor cores from 258 patients. TMA slides were stained via immunohistochemistry. VCAN and V-kine stains were scored on a scale of 0 to 3 based on intensity of stromal staining. The number of tumor-infiltrating lymphocytes was quantified by counting the number of CD8+ T cells touching malignant epithelial cells within two fields at 400X magnification and averaging the counts. MMR proteins were scored as absent or present in each sample by pathology. Samples were classified into three groups based on strength of proteolysis: High Proteolysis = VCAN 0 or 1 and V-kine 3, Low Proteolysis = VCAN 3 and V-kine 0 or 1. All other samples were put into the Medium Proteolysis group. Descriptive statistical analysis was done in Excel.

RESULTS: Here, we report that VCAN proteolysis correlates with CD8+ T-cell infiltration in endometrial cancer, a trend that was previously published by this group for colorectal cancer. Moreover, high VCAN proteolysis, as well as MMR deficiency, correlates with high CD8+ T cell infiltration; 78% of the MMR Deficient samples, and 62% of the High Proteolysis samples, were above the median CD8 count of 5.25. Furthermore, clinical recurrence is strongly correlated with VCAN expression.

CONCLUSIONS: Our findings point to VCAN proteolysis promoting immunological sensitivity in endometrial cancer, providing further physiological rationale, beyond MMR deficiency, for ongoing immunotherapy trials. More broadly, the positive association between VCAN expression and recurrence points to VCAN as a potential prognostic immune biomarker for this cancer.
TITLE: Unconscious, Implicit Memory in the Sedated Patient

NAME: Alexander Blair

BACKGROUND: During general anesthesia, about 5% of patients will experience connected consciousness (defined as an individual’s subjective experience of sensory information relayed from the outside world). This means that many patients under general anesthesia may be experiencing the noxious stimuli from which it is designed to disconnect them. However, the large majority of these patients will have no explicit recall of any events during their sedation. This is because the anesthetic agents are also powerful amnesic drugs, making unconsciousness and amnesia easily confounded.

OBJECTIVE: 1 – To determine whether subjects are capable of forming implicit memory while sedated with dexmedetomidine (D); we hypothesized that the strong amnesic effects of D will eliminate the formation of implicit memory and that young, healthy subjects’ performance on two-alternative forced choice word recognition tests (2AFC) will be equivalent to that of random chance. 2 – To determine the incidence of dreaming among subjects sedated with D; we predicted that subjects sedated with D will have a high incidence of dreaming. 3 – Describe the relationship between implicit memory formation or incidence of dreaming and a subject’s plasma concentration of D (Cp); we hypothesized that greater doses of D will vary inversely with both the formation of implicit memory and the incidence of dreaming in sedated patients.

METHODS: Using 2AFC, we studied the effects of D on implicit memory formation and recall. Consciousness state was determined by serially waking subjects and assessing their subjective experience. Cp was measured using a pharmacokinetic/pharmacodynamic model.

RESULTS: We found that the average number of correct words chosen by subjects after exposure during sedation was not significantly different than 8/16 (the score assumed by random chance). There was no significant correlation between Cp and the number of correct words chosen by subjects. The average Cp of subjects who were dreaming was lower than those who reported being unconscious (indicating that dreaming is more prevalent at lower Cp). Of the 349 consciousness state assessments, subjects were dreaming in 115.

CONCLUSIONS: Because 2AFC was not significantly different than random chance, it is unlikely that subjects were able to form implicit memory while sedated with D. As predicted, dreaming was common under D and more common with lower Cp, however Cp was not a good predictor for consciousness state.
TITLE: Outcomes of deceased-donor kidney transplants by age and kidney donor profile index

NAME: Josh Bodnar, Aniruddha Srivastava, Brad C. Astor, Brenda Muth, Fay Osman, Sandesh Parajuli

BACKGROUND: The Kidney Donor Profile Index (KDPI) is a score used to estimate the overall quality of a deceased-donor kidney prior to transplant. When entering the transplant list, patients make decisions based upon this metric, and therefore it is important to understand its impact on transplant outcomes.

OBJECTIVE: This study sought to determine the outcomes of receiving KDPI>85% Kidneys relative to KDPI<85% kidneys based on graft survival and patient survival at two different age groups.

METHODS: This was an observational study of all deceased-donor kidney transplant recipients >40 years of age at the time of transplant between 2011 and 2015 at our University hospital (n=837). Dual organ recipients (e.g. pancreas and kidney) were excluded. Patients were divided into two groups, group 1 included patients over 60 years old at the time of transplant (n=318) who received a KDPI>85% (n=23) or KDPI<85% (n=295). Group 2 included patients between 40 and 59 years of age at the time of transplant (n=519) who received a KDPI>85% (n=29) or KDPI <85% (n=490).

RESULTS: Most of the baseline characteristics were similar across groups. Around 25-27% of ESRD was due to Diabetes (DM) in both groups, Recipients were on dialysis for a longer time in group 1 compared to group 2. In the univariate analysis, KDPI>85% or presence of delayed graft function (DGF) in either group were not associated with patient or graft survival. However, DM as a cause of ESRD was significantly associated with increased risk of graft failure and patient death in group 2 but not in group 1. Similarly, the use of depleting induction immunosuppressive compared to the non-depleting agent was significantly associated with increased risk of graft failure and patient death in both groups. After adjustment in multivariate analysis, in group 1, DM was associated with increased risk of graft failure [HR: 1.4, CI: 1.0-1.9, p=0.03] and death [HR: 1.44, CI: 1.1-1.9, p=0.03], along with in group 2 for graft failure [HR: 1.76, CI: 1.2-2.6, p=0.003] and death [HR: 1.75, CI: 1.2-2.5, p=0.002]. The similar, association was found for the use of depleting immunosuppressive medications in both groups for graft and patient survival.

CONCLUSIONS: In our observation, elevated KDPI>85% was not associated with patient or graft survival regardless of age. The provider should consider these factors during transplant.
POSTER 13

NO DIFFERENCE IN BREASTFEEDING RATES IN WOMEN WITH POLYCYSTIC OVARY SYNDROME

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Background: Women with PCOS have increased rates of obesity and gestational weight gain compared to women without PCOS, factors which are associated with decreased breastfeeding (BF).

Objective: Our objective was to evaluate if women with PCOS were less likely to initiate BF.

Design: Cross-sectional analysis of participants in the PRAMS (Pregnancy Risk Assessment Monitoring System) dataset, a national questionnaire from the Centers for Disease Control (CDC) sent to postpartum mothers 2-9 months after delivery. PCOS status and BF were by self-report. Logistic regression was used to assess odds of ever BF. Length of BF was assessed using Cox proportional hazards with right censoring for women who were still BF at the time of follow-up.

Methods: PCOS status was available for 14 states. Median response time was 3.7 months postpartum. Data from 16,036 participants were included which represents 855,302 women due to sample weights. 6.6% of women reported having PCOS and 83.8% reported ever BF.

Results: Compared to women with a normal BMI, women who were overweight or obese had decreased odds of BF (OR: 0.7, 95% CI: 0.6–0.9, P=0.01; OR: 0.6, 95% CI: 0.5–0.7, P<0.001 respectively); however, PCOS was not associated with BF (OR: 1.1, 95% CI: 0.9-1.3, P=0.6). In multivariate analysis, women with PCOS still were at no decreased odds of BF after adjusting for age, BMI, race, ethnicity, infertility treatment, and delivery factors (ORadj:1.1; 95% CI: 0.8-1.4; P=0.6). Variables associated with decreased odds of BF included: overweight/obesity, age ≤ 19 yrs (vs. 25-29), Black race, smoking, undesired pregnancy intent, gestational age ≤27 wks, and prior live birth. Variables associated with increased BF included: age 30-39 yrs, hospital stay 1-2 days (vs. 3-5), Hispanic ethnicity, and ≥ 3 stressors. There was no difference in mean BF length (13.0 vs. 12.9 wks; P=0.9). In multivariable Cox models, women with PCOS did not have a shorter length of BF (HRadj: 0.9, 95% CI: 0.8-1.1, P=0.3).

Conclusion: In this national survey, women with PCOS were at no decreased odds of BF, despite confirming the association between overweight/obesity and decreased BF. This is good news for women with PCOS who are planning pregnancy and desire BF; however, our data still supports clinical relevance of carefully targeting women with PCOS for BF education due to the association of PCOS with increased BMI. Additional prospective studies are needed to fully understand the association between PCOS and BF.
Title: Telemedicine in the Management of Chronic Kidney Disease in the Correctional Setting: Assessing a Care Model

Name: Max Butler

Background: The United States prison system houses a vulnerable population with a high burden of disease. Access to specialty care is complicated by limited on-site providers and costs associated with transportation of inmates. Telemedicine has been employed to address these barriers, but its use in the care of chronic kidney disease (CKD) in correctional populations has not been evaluated in previous literature.

Objective: The purpose of this study is to evaluate the management of CKD in a telenephrology clinic via average annual change in estimated glomerular filtration rate (eGFR), control of blood pressure (BP), and clinic utilization, and identify areas for future quality improvement (QI) projects.

Methods: Charts for all patients seen at the UW Health telenephrology clinic from January 2015-July 2019 were reviewed for this QI analysis. eGFR was calculated for patients with at least three years of serum creatinine measurements using the CKD-EPI equation. Annual change in eGFR was assessed using ordinary least squares linear regression analysis. BP was measured at the correctional facility and reported to the telenephrology clinic. Patients with at least four BP measurements were evaluated against a goal of ≤130/80 mm Hg. The appropriateness of nephrology referrals was determined by the reason for referral. The number of missed appointments and the reason for these cancellations were documented.

Results: Data were collected from 214 patients from 31 Wisconsin prisons from 2011 to 2019. The population was predominantly male (97%) and African American (52%). The average annual change in eGFR among patients with at least three measurements (n = 37) was -1.57 mL/min/1.73 m² (95% CI: -2.87 to -0.27). Among patients with sufficient BP data (n = 79), 19% met the goal of ≤130/80 mm Hg. With respect to clinic utilization, 19% of the nephrology referrals were deemed unnecessary. The total number of scheduled appointments was 871, with 749 (86%) completed and 122 (14%) not attended.

Conclusions: The annual change in eGFR in this patient population does not appear to differ from national trends; however, BP management was substandard. Future areas of focus for QI initiatives include stricter BP control, reducing the number of inappropriate referrals, and improving appointment adherence. Telemedicine is an effective way to increase access to specialty care for correctional populations, and this paper describes a model for its implementation in the management of CKD.
POSTER 15

TITLE
Explorations in Medicare Policy: Conducting a Systematic Review on Current Definitions of the Safety Net Hospital and the Use of these Definitions in Hospital Reimbursement

NAME
Andrew Carlson
Ryan Powell,
Ph.D. Amy Kind,
MD, Ph.D.

BACKGROUND
In order to design equitable incentive structures that increase the quality and decrease the cost of health care in the United States, policy-makers are in need of evidence evaluating the extent to which hospitals that primarily serve those from socioeconomically disadvantaged backgrounds are at a financial disadvantage relative to other hospitals. Yet, a standard definition, to identify and evaluate safety net hospitals, does not exist. This lack of a consensus definition may complicate the current research landscape by limiting researchers’ ability to detect associations between socioeconomic disadvantage and hospital-level outcomes.

OBJECTIVE
Conduct a systematic review on definitions of the safety net hospital, which identifies the key strengths and weaknesses of existing approaches, provides recommendations for a better definition of socioeconomic disadvantage at the hospital-level, and evaluates their implications for Medicare reimbursement policy.

METHODS
My role was to extract data from a set of 133 articles, entering these data into a framework capable of characterizing the various definitions used in each study. We assessed definitions according to the method dimensions used (Medicaid as payer, self-pay, poverty, etc.), method unit (discharges vs. patients), how definitions were used in analysis (safety net and non vs. highest quartile vs. lowest quartile, outcomes that were assessed using the definition (eg, 30-day readmission), and health systems concepts addressed in the study (access, quality (structure, process, outcome hospital financial performance, costs). After performing my extractions, I evaluated these extractions for agreement with those performed by another team member, resolving differences using a standard process.

RESULTS
While work on this project is still ongoing, some early findings include that studies involving the health care safety net have become over four times more common since 2010 and that payer mix was the most common dimension used in definitions. Medicaid coverage was the most common criterion used. However, significant heterogeneity exists between and within definition types.

CONCLUSIONS
It is important to know which hospitals bear a disproportionate burden of socioeconomic disadvantage, both to better characterize the impact of disadvantage on hospital financial performance (by assessing payer mix, for example), and to analyze health outcomes such as 30-day readmission rate, and to conduct health systems planning. The significant heterogeneity in definitions noted in this systematic review makes policy development and hospital comparison difficult.
POSTER 16
TITLE: A content analysis of recreational marijuana companies’ social media marketing strategies in the District of Columbia

NAME: Nithin Charlly

BACKGROUND: In 2015, an unusual dichotomy occurred in Washington, D.C. regarding the use and sale of non-medical marijuana. Adult non-medical use was legalized in D.C.; however, its purchase and sale remains illegal. Retailers were quick to recognize a legal loophole that allowed the transfer of marijuana through a “gifting” process. While D.C. currently regulates medical marijuana advertising, non-medical marijuana advertising remains unsupervised, allowing retailers to market their products through youth-dominated social media. As social media has been shown to impact adolescents’ decisions, this scenario presents a highly influential situation for a vulnerable population. Consequences of marijuana use during adolescence include altered brain development, poor educational outcomes, and an increased chance of drug dependence during adulthood.

OBJECTIVE: This study aimed to evaluate the promotional content utilized by D.C.-based non-medical marijuana retailers on Instagram.

METHODS: A content analysis of social media posts was conducted to analyze their compliance to pre-existing advertising laws concerning non-medical marijuana in Washington state. Relevant posts were identified using hashtags such as #dcweed and #i71compliant. Non-medical marijuana companies were categorized into two categories: explicit and implicit. Explicit profiles included any of three terms: “i71 compliant”, “21+”, or “not for sale”, whereas implicit businesses lacked these terms. All posts were coded for presence or absence of key variables, including youth appeal, encouragement of overconsumption, use of diversity in marketing, and display of pro-marijuana education. Inter-raters were used to assess consistency among coding; agreement was recorded at above 90%.

RESULTS: A total of 1,476 posts were evaluated. Out of their respective total posts, explicit business profiles contributed 61% (n=502) of posts appealing to youth, while 54% (n=85) of explicit profiles included any of three terms: “i71 compliant”, “21+”, or “not for sale”, whereas implicit businesses lacked these terms. All posts were coded for presence or absence of key variables, including youth appeal, encouragement of overconsumption, use of diversity in marketing, and display of pro-marijuana education. Inter-raters were used to assess consistency among coding; agreement was recorded at above 90%.

RESULTS: A total of 1,476 posts were evaluated. Out of their respective total posts, explicit business profiles contributed 61% (n=502) of posts appealing to youth, while 54% (n=85) of implicit businesses’ posts appealed to youth. Further assessment of implicit retailers revealed that 78% (n=124) of posts encouraged overconsumption, 70% (n=110) of posts utilized diversity in marketing, and 63% (n=100) of posts displayed pro-marijuana education.

CONCLUSIONS: These findings may demonstrate the use of youth-dominated social media for non-medical marijuana advertising. Therefore, there may be a need to reassess current legislation regarding non-medical marijuana promotion in D.C., especially for monitoring inappropriate marketing to youths.
POSTER 17

TITLE: Thyroid Ultrasound Reports: Will TI-RADS Improve NLP Capture of Critical Thyroid Nodule Features?

NAME: Kallie J Chen

BACKGROUND: Critical thyroid nodule features are contained in unstructured ultrasound (US) reports. Recent synoptic reporting systems like Thyroid Imaging, Reporting, and Data System (TI-RADS) use 5 key features to risk stratify nodules and recommend appropriate intervention. Natural language processing (NLP) captures important data from text reports and may have potential in decision support for nodule management.

OBJECTIVE: Our study aims to analyze the quality of US reporting and the potential benefit of applying NLP for capturing TI-RADS features.

METHODS: Our retrospective study analyzed thyroid US reports between 2007-2013 from electronic health records from an academic medical center (A) and community hospital (B). For each site, we used a physician-annotated “gold standard” to analyze frequency of nodule features used in TI-RADS scoring and clinical recommendations contained in US reports. We also evaluated the accuracy of a previously described NLP system to capture these nodule features.

RESULTS: A total of 282 US reports were collected, from which the gold standard identified 409 nodules at least 1-cm in maximum diameter. Only 3 nodules contained enough information for a complete TI-RADS score. Using gold standard annotations, we found shape was described most often (92.7% of nodules) while margins were described least often (11%). The median number of unreported TI-RADS features per nodule was 3. Using features that were reported, 191 nodules (46.7%) were suspicious as indicated by TI-RADS score ≥3. 108 nodules (26.4%) included clinical recommendations, which were more likely to be included at site A than B (33.9 vs. 17%, p<0.05). Among these recommendations, 56.7% disagreed with those based on retrospectively applied TI-RADS scores. 67.5% of suspicious nodules did not include any clinical recommendations but were more frequently included at site A than B (39.2 vs. 25.5%, p<0.05). Compared to the gold standard, the NLP system missed 33 nodules and was significantly less accurate in capturing echogenicity (27.5%) and margins (58.9%). When comparing NLP between centers, NLP performed equally well in overall accuracy.

CONCLUSIONS: Our results suggest a wide gap between current US reporting styles and those needed for TI-RADS clinical application. TI-RADS-based synoptic reporting should prompt more complete US reporting, improved recommendations for intervention, and better NLP performance on thyroid US reports.
Title: Neutrophils from patients with invasive candidiasis are inhibited by device-associated biofilms

Name: Jack Chovanec

Background: When growing as a biofilm, Candida resist the host immune defenses. Previous studies show that neutrophils from healthy donors do not effectively kill Candida biofilms by impairing the generation of reactive oxygen species (ROS) and the formation of neutrophil extracellular traps (NETs). However, there are no data demonstrating how neutrophils from patients with candidiasis respond to Candida biofilms.

Objective: This study investigates neutrophil response to Candida biofilms from patients with candidiasis.

Methods: To investigate the immune response to Candida biofilm, blood samples were obtained from 8 adult individuals admitted as inpatients and diagnosed with invasive candidiasis based on the isolation of Candida from a normally sterile site. Neutrophils were isolated and co-cultured with equal burdens of C. albicans biofilm or non-biofilm (planktonic) cells. We estimated NET release using Sytox Green staining of free DNA. The production of ROS was measured using an oxidative stress assay. Experiments were performed in triplicate and analyzed using a Student’s T-test with p<0.05 considered statistically significant.

Results: At baseline, compared to healthy volunteers, the patient neutrophils had higher free DNA, suggesting an increase in background NETosis. Also, in response to PMA, a chemical stimulant, neutrophils from patients elicited a 2-fold greater NET release, when compared to the neutrophils from healthy participants. However, patient neutrophils did not release higher levels of NETs in response to planktonic Candida, and they did not form NETs to biofilm beyond the background. Compared to healthy donor response, patient neutrophils had increased ROS production and this effect increased with PMA. Additionally, the high ROS production increased with planktonic cells but not to biofilm.

Conclusion: Compared to neutrophils from healthy individuals, those from patients appeared activated, with higher baseline NET formation and ROS production. However, despite this activation, neutrophils from both groups were inhibited by Candida biofilms. Further understanding how this impairment of neutrophils by devices-associated will aid in the development of new candidiasis therapies.
POSTER 19
TITLE: Using Electronic Health Record Data and Machine Learning to Predict Outpatient Falls After Emergency Department Visits

NAME: Alex Clegg

BACKGROUND: Older adults are at increased risk of falling after an ED visit, and these falls are preventable with the appropriate interventions. Despite this, no tools exist to easily screen older adults for fall risk. Prior work has demonstrated that machine learning (ML) algorithms based on discrete EHR data can predict falls using minimal resources, and that a number needed to treat (NNT) analysis could be used to assess the impact of pairing screening with referral to risk-reduction interventions. Additionally, prior literature has identified several risk factors that are predictive of future falls that cannot be included in such models as they are not generally captured in discrete EHR fields.

OBJECTIVE: To create a simple, three question screening tool based on prior literature and to evaluate the effect of this tool’s integration into a ML algorithm in predicting return visits to the ED for falls. We hypothesized that the predictive ability of a hybrid model that includes input from both the specific questions and discrete data would outperform either method in isolation.

METHODS: Retrospective electronic record review at an academic medical center. Individuals were aged 65 and older and seen in the ED from January 1, 2017 through January 31, 2019. We evaluated the utility of three new screening questions alone and in addition to discrete EHR data in predicting ED visits for a fall within 6 months of an all-cause index ED visit. We used logistic regression, elastic net, random forest, AdaBoost, and XGBoost algorithms. Predictive performance was analyzed using area under the curve (AUC) of the receiver operating characteristic (ROC) graph. Based on model precision and an intervention described in prior literature, we also calculated projected NNT when pairing these models with referral to a falls risk reduction clinic.

RESULTS: The models that incorporated the fall screening questions data had similar AUCs and NNTs to a model that solely used discrete EHR data. Both models which contained discrete data performed better than screening question data alone. The best AUC for ML only, ML plus screening data, and screening data only were 0.743, 0.752, and 0.705 respectively. The best NNTs for ML only, ML plus screening data, and screening data only were 12.6, 10.9, and 12.4 respectively.

CONCLUSION: Incorporating questionnaire data to augment a discrete-data-only ML approach did not substantially increase the performance of predictive models compared to a ML approach alone, from both a data science and clinical perspective.
TITLE: Pilot study to determine radiomic features of non-small cell lung cancer recurrence using conventional CT scans

NAME: Kevin Condit

BACKGROUND: In the treatment of patients with non-small cell lung cancer (NSCLC), CT imaging represents the primary means to follow response to radiation treatment. Unfortunately, following stereotactic body radiotherapy (SBRT), many scans are indeterminate due to the challenges in discerning recurrent tumor from developing fibrosis, often necessitating PET/CT and/or tissue biopsy.

OBJECTIVE: The objective of this study was to assess radiomic features from non-contrast CT to determine if radiometric analysis of imaging may be used to differentiate between tumor recurrence and benign scar.

METHODS: This retrospective, matched-pair cohort study consisted of pre- and post-treatment imaging from 26 patients with early stage NSCLC – treated with SBRT between 2009 and 2019 were matched for age, tumor size, TNM staging, smoking status and radiation dose. A region of interest (ROI) for radiomic analysis was defined by contouring the gross tumor volume (GTV) in the imaging software, MIM, and expanding this volume by one centimeter to include radiographic changes that occurred surrounding the initial tumor. Pre- and post-treatment images were registered to match treatment location for radiomic analysis and the GTV and expanded volume were registered for all follow-up scans. PyRadiomics was used to analyze 108 radiomic features associated with each ROI. Data was exported to MATLAB for statistical analysis using Student’s t-test to determine radiomic parameters that differed between recurrent and non-recurrent patients.

RESULTS: Preliminary longitudinal radiomic analysis was performed on 8 patients with 48 total follow-up CT scans. At baseline, 28 radiomic features differed between the recurrent and non-recurrent groups. Nine of these features remained significantly different at the penultimate and final scans, suggesting sustained alteration in CT parameters between patients with recurrence and those who developed scar. The majority of these features were of the Gray Level Run Length Matrix category.

CONCLUSIONS: This pilot study demonstrated that radiomic features of pre- and post-treatment CT imaging are changed differentially between recurrent tumor and fibrosis. Longitudinal analysis and development of a multivariate, predictive model are currently underway.
POSTER 21

TITLE: Enhancing Outcomes and Optimizing Learning through Gathering Timely Student Input: A Quality Improvement Approach

NAME: Trevor L. Cooper

BACKGROUND: Medical student dissatisfaction and indifference poses a risk to engagement if learners believe their feedback is only a formality for accreditation purposes. There is a current disconnect between the Medical Education Office’s (MEO) openness towards student input and the prevailing perception that it is static. Although, MEO leaders are listening, students continue to feel unheard leading to high levels of dissatisfaction.

OBJECTIVE: My project’s goal is to use formal evaluation and assessment practices to guide future quality improvement aimed at enhancing communication and collection of feedback from students. This feedback can then inform decisions for medical education and student services.

METHODS: In preparation for accreditation, a comprehensive assessment about the student experience at UWSPH was conducted. While the majority of UWSMPH indicated a high level of satisfaction to many survey items, there were several identified for improvement including satisfaction with MEO’s responsiveness to student concerns. As such, MEO surveyed the entire study body during the 2018-19 school year to gain internal data on student satisfaction with feedback.

The internally collected data showed a worsening percentage of students from the class still rating themselves as dissatisfied with the medical school’s responsiveness to feedback. This summer, new qualitative data was gathered from an M1 focus group and key informant interviews from relevant stakeholders. These stakeholders provided insight as to their perception of processes done for collecting student feedback to define the current state.

RESULTS: Below are the themes identified from the M1/2 focus groups contributing to their satisfaction with course feedback.

1) Improve transparency and trust
2) Transparency with course feedback
3) Explain why changes can’t or won’t be made
4) Disseminating feedback through timely and purposeful communication
5) Clarify how student feedback is compiled, reviewed, and used
6) The role of elected block representatives

CONCLUSIONS: Moving forward with the feedback processes at UWSMPH entails transforming the current system of programs to a system of horizontal accountability that is driven by shared values and goals. It not only falls upon administration, but also students to work towards the desired state for feedback.
Title: Examining the Effects of Specific Dietary Amino Acids on Metabolic Health
Name: Claudia G. Dantoin

Background:

Obesity and type 2 diabetes have become an epidemic in the United States and worldwide. Current dietary interventions, with the intent to mitigate or reverse these metabolic disorders, primarily focus on reducing calorie intake; however long-term compliance with calorie-restricted diets is low. A more recent development has been to focus on macronutrients. While popular culture suggests that high-protein diets promote weight loss, low protein diets extend lifespan in mouse models as well as reduce adiposity while maintaining lean muscle mass, and epidemiological and clinical trials suggest low protein diets promote metabolic health in humans as well.

Dietary protein is made of amino acids, nine of which are essential in the diet. Examination of diets in which one essential amino acid was reduced at time revealed distinct metabolic roles for each amino acid. Restricting histidine (His) lowers body fat and improves glucose tolerance in diet-induced obese mice; histidine levels in the diet are also positively associated with BMI in humans. Conversely, restriction of the branched chain amino acid Leucine (Leu) promotes fat mass gain in lean mice.

Objective:

With this in mind, we tested the effects of supplementing, rather than reducing, dietary levels of His and Leu in the context of both a control and a Western diet (WD).

Methods:

A total of 60 C57BL/6J mice were randomized to one of 5 diets groups starting at 6 weeks of age: Control, Control + 2xHis, WD, WD+2xHis, and WD+2xLeu. All Control-based diets and WD-based diets were isocaloric, with identical levels of fat and carbohydrates; the calories added through amino acid supplementation were balanced by proportional changes in non-essential amino acids. We determined body weight and food consumption each week following the diet switch, and performed MRI scans to determine body composition every three weeks. We utilized metabolic chambers to measure activity and energy expenditure over a 24-hour span after 8 weeks on the diets. We also assessed the effects of the diets on blood sugar homeostasis, performing glucose and insulin tolerance tests on fasting mice approximately every 3 weeks. We then analyzed the data and identified statistically significant differences in weight, adiposity, and glucose tolerance over time.

Results:

Results over the twelve-week period indicate that while overall food consumption and energy expenditure were approximately the same between groups, body weight increased the most in the WD+2*His group, indicating the supplemented histidine contributed to the added mass. This group showed an increase in fat mass and adiposity proportionally more than any other group as well as a decrease in glucose tolerance.

Conclusion:

In both humans and mice, increasing the percent of histidine in the diet results in greater weight and adiposity. A further area of inquiry would be a reduction in histidine levels in the human diet to prevent or treat obesity.
Cancer-associated fibroblast engraftment to model the pancreatic cancer tumor microenvironment in murine allografts

Mitchell Depke

BACKGROUND Immunotherapeutics have shown significant benefit for certain cancers; however, pancreatic ductal adenocarcinoma (PDAC) has been largely resistant. The mechanisms by which tumor infiltrating lymphocytes are excluded from PDAC are not well characterized. One key hallmark of PDAC is the dense desmoplastic tumor microenvironment. A recently discovered large matrix proteoglycan, versican, with immunosuppressive activity has shown to accumulate in the extracellular matrix of PDAC. However, the pancreatic cancer allografts, commonly used for preclinical studies, do not possess the abundant stromal compartment or versican.

OBJECTIVE The objective was to investigate whether grafting pancreatic stellate cells (PSCs) with pancreatic cancer cells will result in a more representative model of PDAC and how dual immunotherapeutic treatment, targeting PD-1 and CSF1R, changes the tumor immune cell niche and tumor growth.

METHODS Murine spheroids derived from a KPC tumor line (Pdx-1-Cre; LSL-KrasG12D; LSL-Trp53 R172H) and PSCs derived from the pancreas of wildtype B6 mice, were subcutaneously engrafted at a 1:2 ratio into 32 mice. Once tumors were palpable, mice were randomized into four treatment groups: vehicle control, anti-CSF1R, anti-PD-1, or combination anti-PD-1 plus anti-CSF1R. Tumor dimensions were measured twice weekly for 15 days. Upon conclusion, tissue was collected for further analysis.

RESULTS In B6 recipient mice, combination anti-PD-1 plus anti-CSF1R resulted in lower average tumor growth (333 ± 207) than vehicle treated controls (655 ± 418), p-value=0.02. Increased versican, α-SMA (PSC marker), and E-cadherin (epithelial cell marker) staining was observed in the co-allograft model compared to previous PDAC mouse models but remains decreased compared to a transgenic KPC mouse model. A recent KPC allograft using low-passage KPC spheroids, in place of high-passage, restored E-cadherin and versican intensity.

CONCLUSION The combination of anti-CSF1R and anti-PD-1, slows PDAC tumor growth, but there is no significant difference compared to previous treatment results of KPC spheroid allografts. Co-engraftment with PSCs proved to restore the abundant stromal architecture seen in PDAC, thus, serving as a more representative model of PDAC. Engraftment with a high-passage KPC line likely limited versican accumulation, ultimately altering tumor response, and warranting further studies utilizing low-passage KPC spheres and investigating versican proteolysis.
TITLE: Applications of Quality Improvement to Enhance Responsiveness to Feedback

NAME: Natasha Dombrowski

BACKGROUND: How well administration, faculty, and staff communicate with the student body is paramount to the success of any medical school and integral to the satisfaction of students (Robins et al., 1997). However, few specific communication strategies have been identified as being consistently successful in the medical school context. In an effort to understand the current state and ideal state of communication, specifically about responding to student feedback, a rigorous quality improvement (QI) project was done to analyze and understand our current state of communication and create a plan to reach a desired state of communication.

OBJECTIVE: Use QI methodologies to identify the current state of communication from the School to the student body at UW-SMPH, define a desired state, identify barriers to the desired state, and create a plan.

METHODS: I reviewed data collected by the Medical Education Office on student satisfaction surrounding responsiveness to feedback as well as gathered my own data through a series of interviews with medical students, faculty, and staff. Using the qualitative data, I completed a root cause analysis diagraming my findings with fishbone diagrams per quality improvement methodologies. To better understand the current best practices in undergraduate medical education, I conducted a literature review through PubMed.

RESULTS: I found that the current infrastructure lacked transparency, did not provide enough opportunities to give feedback, nor facilitated an efficient response to this feedback. The roles of student and administrative leadership in feedback were also sometimes unclear and lacked visibility among students. Repositories of information like Oasis were difficult to navigate which also made finding important information challenging. Finally, I identified several attitudes which lead to student dissatisfaction including stagnation, paternalism, and mistrust.

CONCLUSIONS: The following are my broad recommendations based off my findings and each includes subpoints which are not shown here.

1. Increase visibility and student engagement in the current feedback processes
2. Partner with MSA and MSS to define roles of student leaders
3. Increase opportunities for feedback in Phase 1 and 2
4. Build trust and convey caring with students
5. Prioritize user friendly interfaces and communications
POSTER 25

TITLE: Impact of Aggressive Transitional Care Strategies on Reducing 30-day Readmission Rates in Veterans Hospitalized for Acute Decompensated Heart Failure

AUTHORS: Tyler Engel; Magdalena Siodlak, PharmD; Peter Marogil, MD; Fauzia Osman, MPH; David Murray, MD

BACKGROUND: Patients hospitalized with acute decompensated heart failure (ADHF) have high readmission rates and mortality. The impact of early post-discharge clinic visits on clinical outcomes is not known.

OBJECTIVE: To evaluate the impact of a post-discharge Heart Failure Access Clinic (HFAC) visit on 30-day ADHF readmission and mortality rates.

METHODS: Admissions to the Madison VA for ADHF between April 2018 and May 2019 were assessed retrospectively. Exclusions were as follows: death during index admission, referral to hospice, care at an outside VA, LVAD/Transplant, or elective admission. For veterans with multiple admissions, only the first hospitalization was analyzed. Demographic, laboratory, and clinical variables were collected. Thirty-day readmissions for ADHF and all-cause mortality were analyzed. Categorical outcomes were compared using chi squared test/Fisher’s test, continuous variables via one-way ANOVA and Kruskal Wallis tests for non-normal data. Cox proportional hazard models were used to obtain relative hazards of outcomes.

RESULTS: Of the 219 unique hospitalizations, 145 were offered HFAC and 74 were offered Primary Care Provider (PCP) follow up. Of the patients offered HFAC, 118 patients were seen. Patients offered HFAC were younger (71.5 vs 77.0; p<0.001) and had lower left ventricular ejection fractions (42.6% vs 51.4%; p<0.001). Patients offered HFAC were more likely to be seen within 30 days (81.4% vs 50%; p<0.001) and to have heart failure (HF) medication adjustment (30.5 vs 10.8; p<0.02). Patients offered HFAC had comparable 30-day readmission rates (15.9% vs 17.6%; p=ns) and all-cause mortality (4.8% vs 2.7%; p=ns) to those seen by PCP. Except for active smoking (11% vs 25.9%; p=0.04), patient demographics were comparable between veterans who were seen in HFAC versus those who were offered HFAC but not seen. Patients seen in HFAC had lower 30-day readmission rates (11% vs 37%; p=0.001) and all-cause mortality (1.7% vs 18.5%; p=0.003) versus those who were not seen.

CONCLUSIONS: Veterans offered HFAC had comparable 30-day morbidity and mortality to those followed by PCP despite being seen more frequently within 30 days and more likely to have HF medication adjustment. Veterans who were offered HFAC but not seen had a significant increase in 30-day readmission rate and all-cause mortality. Further study needs to be undertaken to determine whether the HFAC visit is responsible for the reduction in adverse outcomes.
POSTER 26
Title: The effect of immunotherapy on outcomes of patients with non-small cell lung cancer brain metastases treated with stereotactic radiosurgery.

Name: Tom Enright

Background: Immunotherapeutic (IT) checkpoint inhibitors are commonly used as front-line treatment for non-small cell lung cancer (NSCLC), a cancer that often metastasizes to the brain. Stereotactic radiosurgery (SRS) offers an effective therapy for these metastases but can cause radionecrosis. The effect of immunotherapy on NSCLC brain metastasis patients remains incompletely understood.

Objectives: The aim of this study was to examine whether immunotherapy improves local control, distant brain control, incidence of radionecrosis, or overall survival for patients with NSCLC brain metastases treated with SRS.

Methods: One hundred and eight patients with NSCLC and newly diagnosed brain metastases treated with SRS from 2014-2019 were retrospectively reviewed. Patients who did not receive follow-up MRI brain imaging or received prior whole brain irradiation, targeted therapy for epidermal growth factor receptor (EGFR) mutations or anaplastic lymphoma kinase (ALK) rearrangements were excluded. Survival times were estimated using the Kaplan-Meier method. Univariate analyses using Cox proportional hazard regression models were used to determine if immunotherapy could predict overall survival, distant brain failure, local control, and radiation necrosis.

Results: Fifty-two patients (n=24 IT, n=28 no IT) with 99 newly diagnosed NSCLC brain metastasis lesions (n=53 IT, n=46 no IT) treated with SRS were included. For all patients, median overall survival at one year was 54.1% (46.8-61.4) and the local control rate was 86.2% (81.2-91.5). The local control rate at one year in the patients that received IT was 82.5% (75.3-89.7) and 88.4% (82.1-94.7) in those that did not (p=0.13). Additionally, there was no difference in distant brain control (37.3% IT vs 50% no IT), radionecrosis (16.5% IT vs 9.6% no IT), or overall survival (54.9% IT vs 54.1% no IT).

Conclusions: We found no significant differences in local control, distant metastasis, incidence of radionecrosis, or overall survival for patients with NSCLC brain metastases treated with SRS between those that received immunotherapy and those that did not. We are currently expanding our analysis to include patients with NSCLC brain metastasis treated with fractionated stereotactic radiotherapy (FRST) may help to elucidate any differences.
POSTER 27

Title: Role of Radiofrequency Ablation in the Treatment of Chronic Headaches.

Authors: Cody Falls, Susan Luo, Alaa Abd-Elsayed

Background/Introduction: The refractory nature of pericranial neuralgia-associated headaches make it vital to have multiple well-elucidated treatment options available for pain physicians. Radiofrequency ablation is particularly promising due to it’s potential to serve as a long-term treatment option and allow for the complete eradication of many side effect-laden medications. Current studies on this treatment approach lacked, therefore we decided to carry out a retrospective review tracking patient outcomes.

Objective: To further elucidate the efficacy of RFA as a treatment option for pericranial neuralgia-associated chronic headache disorders.

Methods: We retrospectively reviewed the medical records of all patients who underwent pericranial radiofrequency ablation procedures in order to alleviate chronic headache pain dating from Jan 1, 2015 to Mar 1, 2019. To assure headaches were pericranial neuralgia-related, all candidates underwent a minimum of two diagnostic nerve blocks with positive response (>50% pain relief). Diagnostic nerve blocks consisted of the injection of local anesthetic to the particular nerve that the headache pains were attributed to as assessed by the pain physician. Patient pre-procedure pain scores were assessed via questionnaire prior to treatment. Primary outcomes of pain relief and duration of relief were assessed via questionnaire at follow-up appointments. All questionnaires were uploaded to patient electronic medical records where they were accessed. Headache-related emergency department visits were pulled directly from patient electronic medical records. Statistical analysis was then carried out comparing pre- and post-procedure metrics using a paired sample t-test with significance defined as p<0.05.

Results: This analysis included 211 patients and 353 individual RFA procedures with patient age of 45±16 years. 94.8% of the patients involved were white, 4.7% were African-American, and 0.5% declined to answer. As for biological sex, 75.6% of the patients studied were female and 24.6% were male (Table 1). Significant improvements were noted across all metrics. Pain scores dropped from 5.62 ± 2.18 to 2.93 ± 2.29 (p < 0.001) with an average relief of 61.31% ±33.8. There was also a notable decrease in headache-related emergency department visits dropping from 1.62 ±3.79 to 0.36 ±1.52 (p<0.001). The average duration of relief was 199 ±168 days (Table 2).

Conclusions: RFA continues to show strong results in the treatment of headaches. This expanding body of evidence continues to support its ability to serve as an effective treatment option. Statistically significant reductions in pain scores as well as headache-related emergency department visits coupled with the long duration of relief and minimally-invasive nature of the procedure make it a particularly attractive option that should be considered in the treatment of all affected patients.
Background
In the United States, newborn care is a significant contributor to healthcare costs. For infants requiring neonatal intensive care unit (NICU) care, direct annual care costs for low-birth-weight infants through the first year of life are estimated at >4 billion dollars. In managing premature neonates, inconsistent clinical practice, lack of guidelines, and good intentions may lead to ordering nonessential labs, which do not positively impact care, but do increase resource expenditures.

Objectives
To reduce potential harm from avoidable needle sticks, decrease loss of blood volume and use of blood products, and to reduce healthcare costs related to routine laboratory tests conducted in premature neonates, we sought to identify a timepoint during the 1\textsuperscript{st} week after delivery at which electrolyte values are consistently within a normal range. This timepoint will be used to develop a clinical tool to prevent unnecessary labs from being ordered.

Methods
A retrospective analysis of 2018 laboratory data from premature neonates (23–30 weeks’ gestation) cared for in the UnityPoint Health-Meriter Hospital NICU was conducted. Median values and IQR, grouped by gestational age, were calculated with respect to the day of age the lab was ordered. This quality improvement project was deemed IRB exempt.

Results
A total of 1028 sodium labs from 378 neonates and 1029 potassium labs from 399 neonates were drawn in the first week of age. At day of age 4, all gestational groups excluding 23 weeks’ fell within the normal range for both sodium and potassium. Most of neonates had normal range sodium (84\%) and potassium (68\%) on day 4 of age.

Conclusions
By day of age 4, most neonates born at 24–30 weeks’ gestation had sodium and potassium levels in a normal range. Day of age 4 may be an appropriate time to implement a clinical bedside rounding tool that encourages careful discussion about the purpose and necessity of ordering sodium and potassium labs. This tool is not intended to prevent ordering labs if indicated, but rather will increase attention to whether these labs are needed. Future directions of this quality improvement project will be to implement the rounding tool and observe pre- and post- implementation data to determine if lab draws can be reduced while maintaining a high standard of care.
TITLE: Factors influencing the Interpretation of Doubtful Second Patch Test Readings for Allergic Contact Dermatitis

NAME: Collin Goebel, Margo Reeder MD, and NACDG Members

BACKGROUND: Patch testing is the gold standard in allergic contact dermatitis diagnosis. Patch test readings are categorized as mild, moderate, severe, irritant only, doubtful, or negative. After second patch test readings, a final interpretation is performed to categorize the patient as either allergic or not allergic to a given chemical. Despite the common utilization of patch testing, there is no consensus regarding the interpretation of doubtful second readings.

OBJECTIVE: In this study we analyzed associations between positive reactions to common allergens and likelihood of the interpretation of their doubtful patch test readings as positive for allergic contact dermatitis.

METHODS: A total of 2423 doubtful second patch test readings were studied utilizing 2015-2016 patch test patients from the North American Contact Dermatitis Group. The nine most common allergens with doubtful second readings were studied. Fisher’s exact testing was utilized in order to determine associations between positive final interpretations for doubtful second readings for each of the nine chemicals and positive second readings for each of the 70 standard patch test allergens.

RESULTS: Positive final interpretation of doubtful second readings for formaldehyde 1% was associated with positive second readings for formaldehyde 2% and quaternium 15, a formaldehyde releasing preservative. Additionally, positive final interpretation of doubtful second readings for fragrance mix 1 was associated with positive second readings for fragrance mix 2 and myroxylon pereirae, a fragrance. Finally, an association was found between a positive final interpretation of doubtful second readings for propylene glycol 30% and positive second readings for propylene glycol 100% and formaldehyde 2%.

CONCLUSIONS: The final interpretation of doubtful second readings for formaldehyde, fragrance mix, and propylene glycol is influenced by clinician judgement and is associated with positive second readings for similar chemicals. Studying the factors which influence the interpretation of doubtful second readings provides important information for clinicians and allows them to examine patterns present in patch testing in their own clinics.
POSTER 30

TITLE: The Role of MRI in the Management of Head and Neck Cancer

NAME: Alex Griffith

BACKGROUND:
Head and neck cancer is the 6th most common cause of cancer death in the US and is a major health issue worldwide. Magnetic resonance imaging (MRI) is a versatile oncologic imaging modality with unique features that compliment computed tomography (CT) and 2-[18F]Fluoro-2-deoxy-d-glucose (FDG) positron emission tomography (PET) in the diagnosis, treatment, and post-treatment management of head and neck cancer patients. MRI has important advantages over CT, such as in the evaluation of soft tissue extent of tumors, perineural invasion, bone and cartilage invasion and for patients with contrast allergies.

OBJECTIVE:
Our objective was to summarize the role of MRI in the management of head and neck cancer with a particular focus on its role in radiation treatment planning.

METHODS:
Information was gathered through review of the relevant literature and through detailed discussions with a neuroradiologist and radiation oncologist.

RESULTS:
We first provide a practical overview of MRI sequences with a focus on those most relevant to oncologic imaging. Next, we review the anatomy, imaging characteristics, and relevant oncologic issues for the suprhyoid and infrahyoid neck spaces. We provide a detailed review of MRI imaging of the cranial nerves with particular focus on the Trigeminal Nerve (Cranial Nerve V), the Facial Nerve (Cranial Nerve VII), and perineural tumor spread. Finally, we discuss future advances and emerging trends for the use of MRI in head and neck oncology.

CONCLUSIONS:
MRI provides several important benefits over CT based imaging modalities and plays a key role in the management of head and neck cancer patients.
TITLE: Medical Student Perspectives on Effective Surgical Education

NAME: Co-authors Kirsten Gunderson and Kaylee Scott

BACKGROUND: A positive experience during a medical student’s surgical clerkship has been associated with an increased interest in pursuing a surgical career. However, the medical student role on a surgical team is poorly defined, and students frequently feel inconvenient during their rotation. Further investigation into the many aspects of a surgical clerkship that contribute to student experience and learning is needed.

OBJECTIVE: We aim to examine medical student perspectives on effective surgical educators and aspects of surgical culture that encourage or inhibit education.

METHODS: A multiple choice and open response survey was administered to 350 medical students at the University of Wisconsin following their surgery clerkship. Survey responses were analyzed using inductive, line-by-line content analysis. A codebook was created with robust inter-coder reliability (>90% agreement). Dominant themes were extracted and quantified using NVivo 12 data management software.

RESULTS: The survey response rate was 38.6%. Respondents described effective surgical educators as those who are education focused, good at communication, interact with students, and encourage student engagement with the team. Additionally, they possess good interpersonal skills and create a safe environment. Less effective educators were described as having characteristics that were directly in contrast to the themes above. Students were then asked to think about a day when they felt competent and able and compare that to a day when they felt discouraged and less able. Ample educational opportunities, positive team dynamics, high student engagement within the team, and positive personal emotions contributed to having an able day. Low interaction with the student, negative personal emotions, poor team dynamics, and lack of student engagement within the team were themes of a less able day. Finally, we asked which aspects of surgery facilitate education and which impede learning. Students reported the nature of surgical work as the main factor that facilitates education; Human and team factors were the main reason for impeded learning.

CONCLUSIONS: Students feel the nature of surgical work facilitates successful education. However, poor interactions with faculty and residents stifle the learning environment. More resident, attending, and overall team engagement with the students and a clerkship emphasis on teaching may positively impact student outlook and experience on a surgery rotation.
TITLE: Strengthening Primary Healthcare in China: Role of Community Health Centers and “Service Agreements”

NAME: Sofia Haile

BACKGROUND: A robust primary healthcare system is a strong predictor of good population health. Thus, the Chinese government has recently begun to promote new healthcare reforms that strengthen primary care infrastructure. One recent government initiative has encouraged patients to sign “service agreements” to establish stable relationships between patients and primary care providers (PCP). However, few studies have examined this new initiative. In order to better understand service agreements, this paper examines several factors associated with service agreement initiation.

OBJECTIVE: The goal of our research is to provide information on the factors associated with service agreement initiation in a large community health center system in Beijing, China. We hypothesized that being non-local, an ethnic minority, unmarried, or having a chronic disease were associated with lower rates of service agreement initiation.

METHODS: Our study population was made up of data from Yuetan patients (n=76,090) who received care between 2015-2018. The main outcome variable was whether patients had service agreements with a PCP. The main exposure variables were chronic health conditions (primary hypertension (HTN), type II diabetes (T2D), chronic kidney disease (CKD) or heart disease). The secondary exposure variables were marital status, employment status, birthplace, sex and educational level. Chi-square analyses and logistic regression were used to determine associations between exposure and outcome variables.

RESULTS: Bivariate analysis revealed that a greater percentage of people without chronic disease (except CKD) had a PCP. Also, a greater percentage of those who were married, employed, local, female or had a high school diploma had a PCP. Multinomial logistic regression indicated that being local, a high school graduate, Han Chinese, employed, or male increased the odds of having a PCP, whereas being married decreased the odds. Multinomial logistic regression further indicated that having any chronic disease (except CKD) increased the odds of having a PCP.

CONCLUSIONS: These findings reveal that there are socioeconomic disparities in who has a PCP, indicating that sometimes those who could most benefit from having a PCP are also least likely to have one. More study is called for to better understand the implications of these findings. Nonetheless, this study can provide useful direction for future study as primary healthcare in China continues to improve.
Epidemiology of Nontuberculous Mycobacteria in Wisconsin, 2010-2018

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2. University of Wisconsin, Department of Pediatrics
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Background: Nontuberculous mycobacteria (NTM) are a diverse group of mycobacteria that cause lung, skin, soft tissue, and other disease, yet they have not received the same level as study as Mycobacterium tuberculosis. There are more than 170 identified NTM with varied clinical presentations. Relatively little is known about the epidemiology of NTM disease at the state or national level. Here, I describe the variety of NTM clinical disease in Wisconsin. Our longer-term aims are to better describe the geographic distribution of NTM species, and the demographic features of NTM patients. We identify groups with disproportionate rates of infection and generate hypotheses for future research into risk factors. Ultimately, we hope to identify risk factors for NTM susceptibility that may serve as targets for policy interventions.

Objective: The purpose of this study was to characterize the epidemiology of NTM infections in the state of Wisconsin by constructing a database of the NTM infections that were reported to the State Department of Health Services (DHS) in 2010-2018.

Methods: NTM infection records were collected from the Wisconsin Electronic Disease Surveillance System with the help of DHS. The data was then deidentified, duplicates removed, and lab results organized. It was then exported to UW Department of Medicine for descriptive analysis using STATA.

Results: From 2010-2018, 7,725 adults were infected with one or more NTM. From 2010-2018, the mean incidence of NTM infections each year was 858. Of those infected, 52.85% infected were female. Though 7,725 people were infected, 8,995 bacterial cultures were identified. 52 different species of Mycobacterium were identified to cause human disease. The highest incidence species were M. avium complex (6,454), M. chelonae-abscesses group (592), M. fortuitum group (529), M. abscesses group (277), and M. “unspecified” (265). The mean ages of those specific infections were 65, 61, 59, 61, and 65 years old. Sites of infection were also collated, finding that 91% of infections involved the respiratory tract (8173).

Conclusion: NTM cause significant disease in Wisconsin. While five NTM species made up 90.2% of bacterial cultures, 52 different species were found, showing great bacterial diversity. M. avium complex was the most common NTM.
The Role of Patient and Physician Numeracy in the Understanding of Perioperative Risk:
Results of the Anesthesia Numeracy Study.

Ryan R. Hayter

Background: Comprehension of perioperative risk requires the use of numbers in order to make comparisons and establish relevance. Patients with a lower aptitude in numeracy have more difficulty understanding health risks when making decisions and coping with chronic conditions. While studies have shown that nationally people perform sub optimally on numeracy tests, numeracy in presurgical populations has not been well studied.

Objective: The aim of this study was to assess numeracy and comprehension of context-specific risk reduction in a patient population awaiting surgery.

Methods: A cross-sectional survey was created consisting of 3 general numeracy questions and 2 risk reduction questions in an anesthesia context, along with a demographic questionnaire. 506 surveys were mailed to UWHC physicians and 502 surveys were mailed to patients scheduled for surgery between June and September of 2019. Survey responses were analyzed with non-parametric tests and demographic information was analyzed with parametric tests.

Results: 213 out of 502 (42%) patient surveys administered and 267 out of 506 (53%) physician surveys administered were completed. There was a direct correlation between level of education and total survey score (p= 0.001). A direct correlation was noted between level of income and total survey score (p= <0.001). There was a statistically significant difference between actual and self-reported patient total scores, with actual scores being lower on average than self-reported scores. A statistical significance was noted between patient and physician overall score, with physicians scoring higher on average than patients. General numeracy scores were found to trend with scores on anesthesia risk reduction questions, with an increase in anesthesia risk reduction scores as general numeracy scores increased.

Conclusion: Poor general numeracy has a negative effect on the ability to understand how a treatment modifies a baseline risk, indicating that certain patients may not understand treatment efficacy. This, coupled with the disparity between physician health numeracy and patient health numeracy, suggests a need for further inquiry into how to improve patient comprehension of risk modification.
Barriers to Accessing Cancer Pain Management Therapies

JB Hernandez, Peggy Kim MD

**Background:** Living with constant pain has serious implications on quality of life, yet patients are still reluctant to discuss their pain symptoms. Ergo, physicians are less likely to alter pain management plans which leads to patients living with often reversible/manageable, undiagnosed pain.

**Objective:** The objective of this study was to learn about the barriers that prevent patient from discussing pain-related symptoms, as well as encourage a dialogue regarding pain symptoms and referrals.

**Methods:** This study consisted of 21 patients on anti-cancer therapy. The patients were provided with a flier explaining pain management options and referral instructions. The Barriers Questionnaire (BQ) was provided before the educational intervention and 4 weeks after the initial interaction. The BQ focused on concerns for addiction, tolerance, side effects, fatalism, distraction, and desiring to be a good patient. The follow-up survey also assessed the educational flier and explored other potential barriers.

**Results:** On the initial interview, the pain ratings (0-10) for "pain now" had a mean=1.8 and median=0, while the ratings for "average pain" had a mean=2.7 and a median=3.5. Patients largely agreed with the three statements that reflected favorable attitudes towards pain treatment (median agreement ratings of 4, 4, and 4 on a zero-to-five scale). They also largely disagreed with five of the six statements reflecting pain treatment concerns (median agreement ratings of 1, 0, 2, 1, and 1), except for a strong agreement for "danger of becoming addicted to pain medicine" (median = 4). Patients did not indicate strong interest in learning about pain procedures (median = 3, mean = 2.67), and none of the patients had scheduled a pain clinic consultation. On the follow-up interview (n=7), the current pain levels reported increased (mean = 1.1, median = 0), however, none of the other questions differed significantly between the two interviews.

**Conclusion:** Despite the positive attitude towards pain treatment, patients did not indicate a strong interest in pain procedures or pain clinic referral. This might be due to their relatively low pain ratings at the initial interview, making them less motivated to seek a consultation. While the pain ratings had an increase between the clinic interview and the follow-up, it is difficult to draw any firm conclusions from the small sample size.
Title: BI-RADS 3 use among academic and community practices

Name: Nicholas Horswill, Colin Longhurst, Ryan Woods, MD, MPH

Background: Appropriate use of the breast imaging reporting and data systems category for probably benign findings (BI-RADS 3) has the potential to save patients costly invasive biopsies. However, inappropriate use of BI-RADS 3 could delay the identification and treatment of malignancy. Use of BI-RADS 3 has been shown to vary widely, and no benchmarks have been established for the use of BI-RADS 3. There is currently no study comparing use of BI-RADS 3 in an academic settings as compared to a community practice setting, and further between dedicated fellowship-trained breast imagers and general radiologists.

Objective: The purpose of our study was to retrospectively examine the use of BI-RADS 3 in a hybrid academic community setting.

Methods: This retrospective review involved a mammographic database of all studies performed at our academic institution and a satellite community site between 01/03/2006 – 01/03/2016. Exams during the study period were reviewed by 29 radiologists; 17 practiced at the community site, 7 radiologists had split appointments between the two sites (hybrid), and 5 practiced at the academic site. Individual BI-RADS 3 rates were calculated as a percentage of diagnostic exams. BI-RADS 3 rate was compared between the community, hybrid, and the academic group using Pearson’s Chi-squared test. BI-RADS 3 rate was also compared by fellowship training, and years since completion of training. Recall rate from screening exams (BI-RADS 0) and BI-RADS 3 rate was compared using Pearson’s product-moment correlation. Adjustments were made to the model for first patient-observation and for non-independent observations. The practice settings were combined in 2014, and thus BI-RADS 3 rate over the study period was analyzed.

Results: BI-RADS 3 rate between academic + hybrid (0.065) and community (0.129) was not statistically significant when adjusting for patient and radiologist variability. BI-RADS 3 rate compared by fellowship training, breast imaging (0.058), other fellowship (0.127), no fellowship (0.110), was not statistically significant. Comparison of BI-RADS 3 rate against years since completion of training did not show a robust trend or distinct pattern. BI-RADS 3 rate decreased over the study period.

Conclusion: There was no significant variability of use of BI-RADS 3 by practice site, fellowship training, or years of experience. BI-RADS 3 rate did decrease over the study period, likely due to time trends. This suggests that the rate of BI-RADS 3 use is not clearly related to fellowship training, experience, or practice setting.
Title: Communication barriers and solutions to deliver a home-based community paramedic coaching intervention for people with dementia and caregivers

Name: Andrew Huang, Gwen C. Jacobsohn PhD, Manish N. Shah MD MPH

Background: People with dementia (PwD) have complex medical and social needs. The difficult and uncertain nature of managing this disease leads caregivers of PwD to communicate with numerous medical and social service providers regularly. Unfortunately, caregivers describe difficulty coordinating across organizational silos.

Objective: This study aims to identify 1) barriers preventing care coordination between caregivers, health care providers, and dementia service organizations, and 2) strategies for reducing these barriers within the context of a paramedic-delivered coaching intervention.

Methods: Retrospective and concurrent analyses of semi-structured interviews with emergency medicine physicians (n=4), primary care/geriatrics physicians (n=6) and nurses (n=2), community paramedics (n=4), dementia service providers (n=10), and informal caregivers (n=5). We used structural coding to extract and categorize answers to research questions derived from prior thematic analyses.

Results: Responses clustered around three themes: 1) Multiple communication gaps interfere with providers and caregivers staying current on care plan objectives and PwD’s evolving needs. 2) Providers want more comprehensive information about challenges, symptoms, and circumstances that interfere with PwD/caregivers’ implementation and adherence to the care plan. They felt paramedic coaches could help overcome existing communication barriers by relaying observations from the field and documenting disease progression. 3) Structural and process changes that integrate all members of the PwD’s care team using a common electronic platform can better meet all stakeholders’ informational needs. This includes an electronic health record system that provides access to all stakeholders to allow more complete documentation and facilitate conversations between caregivers and providers.

Conclusion: Informational barriers between stakeholders prevent effective communication about PwD’s evolving needs. Stakeholders want a means of coordinating care among providers, social service agencies, and caregivers. Coordinating a care plan via a centralized and fully accessible EHR would allow all stakeholders to independently provide updates and collaborate. Integrating paramedics into EHR systems provides a mechanism for documenting much-desired information to providers who may not otherwise have these insights. Implementing this integrated system would require significant policy changes.
**POSTER 38**

**Patient and Provider Perceptions of Utilizing a Mobile Technology Platform to Improve Surgical Outcomes**

**Authors:** Brandon Huynh BS, Alyssa Joachim BS, David Smith BA, Linda Cherney-Stafford MPH, Esra Alagoz PhD, Daniel Abbott MD, James Barrett MD

**Background:** Despite limited studies demonstrating their effectiveness, patient engagement software is a ubiquitous and expensive commercially available tool designed to improve transitions of care. However, there are no high-quality patient and provider-level data about the usability and implementation of these products for gastrointestinal (GI) surgical oncology patients. This study aims to better understand patient and provider attitudes and perceptions about the implementation of such technology.

**Methods:** Focused interviews were conducted with 11 GI surgical oncology patients and 11 providers (6 transitional care providers, 5 physicians) after demonstrating MobiMD (provider-built patient engagement mobile technology platform) (Figure 1). All interviews were audio-recorded, transcribed verbatim, and analyzed with NVivo software. Data were consensus coded inductively using conventional content analysis and iteratively developed our codebook and code descriptions. We developed data matrices to categorize the themes regarding patient and provider perspectives on the usability and implementation of MobiMD.

**Results:** Our interviews revealed 4 consistent themes: (1) Patients feel there is a lack of reliable resources for perioperative patient education and desire better expectation management; (2) Both patients and providers are highly supportive of using a mobile application intervention to improve education and engagement in the perioperative setting; (3) Providers perceive patient onboarding as an added burden on current workflows and a potential barrier to implementation; (4) After onboarding, transitional care providers expressed that such an application will optimize current workflows associated with perioperative patient monitoring. Specifically, such a platform would reduce the number of time-consuming phone encounters while preserving the quality of transitional care.

**Conclusion:** Patients perceive a need for improved peri-operative education. Providers and patients agree that a mobile technology platform focused on bringing educational content and engaging notifications directly to patients' mobile devices would be an effective solution in addressing this need. Effective implementation of such an intervention may improve patient education and engagement, leading to improved patient outcomes.
**POSTER 39**

**Effects of pressure on pulmonary epithelial cell development**  
Khang N. Huynh

**Background:** Congenital diaphragmatic hernia (CDH) is a severe birth defect, affects about 1 in 2,500 newborns. In CDH, the defect allows abdominal content to move into the chest due to higher pressure in the abdomen, causes increased intrapleural pressure around the lung, and eliminates fetal breathing movements on the affected side. These changes in pressure cause pulmonary hypoplasia and pulmonary hypertension. The mechanisms of these processes are still poorly understood.

**Objective:** The objective of this project is to study the effects on growth and differentiation of developing pulmonary epithelial cells under different mechanical pressures.

**Methods:** Embryonic pulmonary epithelial cells day 14-19 from C57BL/6 pathogen free embryos were used for this experiment. Cells were seeded at 250,000 cells per well in M6621 culture media and placed in custom-manufactured pressure chamber to illicit different pressure conditions. The settings were: static 760 mmHg (control atmospheric pressure), static 750 mmHg (CDH), and static 770 mmHg (tracheal occlusion). After 5 days, cells were analyzed by flow cytometry using fluorescent antibodies against Podoplanin (mucin type transmembrane protein expressed in alveolar epithelium type 1), and surfactant protein C (SpC, a surface protein specific to alveolar epithelium type 2) to help identify between the different types of pneumocytes. Population distribution analysis of baseline day 0 and day 5 populations were compared to illicit the effects of different pressure conditions on the generation and proliferation of different cells types based on surface proteins.

**Results:** There is a significant decrease in cells expressing Podoplanin (pneumocytes type 1) and cells expressing both Podoplanin and SpC (intermediate type) populations at 770mmHg compared to 760mmHg. This difference is not observed between pressure of 750mmHg and 760mmHg.

**Conclusions:** Increased pressure applied on embryonic pulmonary epithelial cell might lead to different growth patterns.
POSTER 40

TITLE: Detection and Classification of Hepatocellular Carcinoma in Abdominal MRI images using a Convolutional Neural Network

NAME: Jacob Johnson

BACKGROUND: Hepatocellular carcinoma (HCC) is 6th most common and the fastest growing cause of cancer in the United States. Magnetic Resonance Imaging (MRI) of HCC has the highest diagnostic accuracy for screening, surveillance and diagnosis of high-risk patients, with specificity approaching 100%, but with sensitivity around 80%. There is therefore opportunity for improvement to help ensure that these deadly cancers are not missed. Convolutional neural networks (CNN), known as deep learning models, have recently been shown to have high performance in detection and classification in many medical imaging applications.

OBJECTIVE: In this work, we aim to assess the diagnostic performance of a CNN in the detection and localization of HCC lesions on dynamic contrast-enhanced MRI.

METHODS: Abdominal MRI imaging studies from the 8 years were collected. Radiology reports were examined to identify cases with a positive imaging diagnosis of HCC. Cases with prior treatment were excluded. Images from positive cases were reviewed by a medical student while referencing the radiology report to identify and annotate HCC lesions. Slices with uncertainty were reviewed and confirmed by a fellowship-trained abdominal radiologist. Three contrast-enhanced phases were chosen for use in the CNN model and were co-registered using publicly available software. An object detection CNN was trained on the annotated images and evaluated on a held-out validation dataset. The model was given the input images and trained to predict lesion bounding box coordinates. The model was evaluated by comparing predicted bounding boxes to the ground-truth annotations. A predicted box was considered a positive detection if it had greater than 50% overlap with a ground truth box and a false positive otherwise. Ground truth boxes without any overlapping predicted boxes were considered false negatives. 5-fold cross validation was performed and median results are reported.

RESULTS: 146 cases of new or untreated HCC were identified. The training data consisted of 1017 bounding boxes. The sensitivity of the median CNN model across the cross-validation experiments was 75% with a mean false positive rate of 0.93 per slice.

CONCLUSIONS: Our results show that a CNN model can be effective at detecting HCC in abdominal MRI images. The trained model may be useful as an adjunct tool to help improve sensitivity of radiologists for these cases. Model performance may benefit from increased quantity of training data.
TITLE: Bone Health Optimization in Orthopedic Surgery

NAME: Aamir Kadri

BACKGROUND: Osteoporosis is associated with adverse orthopedic surgical outcomes. Bone Health Optimization (BHO) is a pre-operative intervention intended to reduce the likelihood of post-operative complications. Data supporting who to evaluate, what such evaluation consists of, and how to intervene pre- and post-operatively are limited.

OBJECTIVE: We aimed to characterize a patient cohort referred for BHO to test the hypothesis that poor bone quality is common in orthopedic surgery and that many such patients meet guidelines for osteoporosis treatment.

METHODS: This retrospective study evaluated the electronic medical records of 124 patients referred for BHO who were age ≥ 50 and candidates for joint arthroplasty or thoracolumbar spinal surgery. Fracture Risk Assessment Tool (FRAX) risk factors and dual-energy X-ray absorptiometry (DXA) results were collected. When available, opportunistic computed tomography (CT) and trabecular bone score (TBS) results were evaluated. World Health Organization (WHO) diagnostic and National Osteoporosis Foundation (NOF) treatment guidelines were applied.

RESULTS: Patient mean age was 69.2 years, 83% were female, 97% were Caucasian, and 56% sustained a previous fracture. The mean ± standard deviation historical height loss was 5.3 ± 3.3 cm for females and 6.0 ± 3.6 cm for males. The mean ± standard deviation lowest T-score of the hip, spine, or wrist was -2.43 ± 0.90 in females and -2.04 ± 0.81 in males (P < 0.08). Osteoporosis (T-score ≤ -2.5) was present in 45% of females and 20% of males; only 3% of females and 10% of males had normal bone mineral density. Opportunistic CT identified 60% likely having osteoporosis. TBS identified 34% with degraded and 30% with partially degraded bone microarchitecture. NOF threshold for osteoporosis treatment was met in 91% of patients. Treatment was prescribed in 75% of patients (45% anabolic, 30% antiresorptive therapies).

CONCLUSIONS: Osteoporosis, degraded bone microarchitecture, prior fracture, and elevated fracture risk were common. These findings indicate a high risk for surgical complications related to bone disease in orthopedic surgical candidates. Given the high prevalence of impaired bone health in this cohort, we believe that bone health screening should be considered in selected orthopedic surgical patients as part of pre-operative optimization for all adults age ≥ 50. We believe that doing so has the potential to reduce post-operative complications and improve outcomes.
POSTER 42

TITLE: Association of preoperative serum total tau and postoperative delirium

NAME: Austin Kayser

BACKGROUND: Postoperative delirium is not only one of the most common postoperative complications, occurring in 50-80% of critically ill patients \(^1\text{-}^4\) and in up to 54% of elective non-cardiac surgical patients \(^5\text{-}^8\), but also an extremely costly one \(^9\). Neurodegeneration, diagnosed by MRI, is associated with postoperative delirium but it is unknown whether plasma biomarkers of neurodegeneration can be used to identify risk of delirium. However, the use of CSF and MRI biomarkers are limited by invasiveness and/or cost. The aim of this study is to obtain preliminary evidence as to whether or not preoperative measurements of serum total tau, as a marker of neural degeneration, is correlated with the occurrence of postoperative delirium and secondarily whether delirium is associated with greater rises in postoperative plasma Tau, than non-delirious patients, suggesting an association with neurotoxicity.

OBJECTIVE: Neurodegeneration is a key risk factor associated with postoperative delirium and is typically assessed using preoperative MRI. We hypothesize that increased preoperative total serum tau will be associated with increased incidences of postoperative delirium and (3) that delirium will be associated with increased postoperative plasma tau.

METHODS: The study consisted of n=11 patients over the age of 65 years old undergoing a major surgery at UWHC defined as requiring a >2 day stay in the hospital. Subjects completed an initial battery of cognitive tests A biomarker specimen was obtained in order to assess total serum tau alongside preoperative clinical collections. Subjects were screened for delirium twice daily during the first 96 hours after surgery including immediately following surgery. If patients were still delirious at 96 hours delirium assessments were continued until delirium resolved. Serum tau was collected after surgery and on postoperative days 1-4. Mann-Whitney U Tests were conducted between patients who experienced postoperative delirium and those who did not. Logistic and linear regression models for delirium incidence and delirium severity using established cofounders were also generated.

RESULTS: Data collection remains an ongoing process however is expected to be complete within the next couple of weeks.

CONCLUSIONS: Once data collection has completed, we expect to see that pre-operative serum tau will predict whether or not a subject experiences post-operative delirium as evidenced by logistic and linear regression models.
POSTER 43

TITLE: The relationship of retinal carotenoid density to measures of vascular health fifteen years later in the Carotenoids in Age-Related Eye Study (CAREDS)

NAME: Jackson Korger

BACKGROUND: Retinal imaging techniques have allowed for the objective measurement of vessel architectural changes believed to be reflective of the vascular dysfunction involved in many systemic and ocular disease states. Throughout the body, the dietary carotenoids lutein (L) and zeaxanthin (Z) have been demonstrated to promote vessel health due to their antioxidative properties. In the eye, L and Z selectively accumulate to form macular pigment (MP), a photoprotective yellow substance concentrated in the fovea. Preservation of MP through dietary modification presents a potential modifiable risk factor for the development of age-related eye diseases, long before ocular manifestations exist. However, there have been no studies examining the relationship between MP and retinal vessel caliber (RVC) over time.

OBJECTIVE: To prospectively investigate the relationship between MP and vascular health, as measures of RVC, 15 years later in the CAREDS cohort.

METHODS: The CAREDS population (N=2,004) consisted of women ages 53-86 who were enrolled in the Women’s Health Initiative Observational Study. A total of 398 fundus photographs taken at CAREDS2 (N=681) follow up were graded (IVAN, version 1.40). The diameter of retinal arteries and veins were estimated as central retinal artery and vein equivalents (CRAE and CRVE) and their ratio (AVR). MP optical density (MPOD) was measured by customized heterochromatic flicker photometry. We investigated the association between MPOD and retinal vessel outcomes utilizing multiple linear regression with adjustment for age and other covariates. Adjusted least square means are presented by MPOD tertile.

RESULTS: Contrary to what was hypothesized, preliminary data show participants in the third tertile (T3) of MPOD had a lower AVR compared to those in the first (T1) (0.68(0.01) vs 0.69, p=0.18). Additionally, compared to T1, T3 had higher CRAE (143.9(1.99) vs 141.7, p=0.25) and higher CRVE (212.7(3.05) vs 206.3, p=0.04).

CONCLUSIONS: We found that higher levels of MP were associated with a lower AVR. This lower AVR seems to be attributed to a relatively greater increase in vein compared to artery diameter in this group. Moving forward with analysis, we are in the process of examining the results in strata for potential confounding or explanatory variables.
POSTER 44
TITLE: Waters’ Diversification of Anesthesiology Residency in the 1920s – 1940s: Ode to Inclusivity

NAME: Adam Krouse

BACKGROUND:

The invention of anesthesia in 1846 allowed for patients to undergo surgery pain-free which permitted surgeons to operate longer and perform more complex procedures. New drugs and procedures were being discovered to aid in the anesthetizing of patients but there were no specialists trained in the field. Prior to the development of anesthesiology as a field, surgeons administered anesthesia in the operating room via the use of in-room nursing staff. As the use of anesthesia grew it became apparent that a class of physicians needed to be trained on its’ complexities. No such residency training existed until the establishment of the Department of Anesthesiology at UWSMPH by Dr. Ralph Waters in 1927. This would constitute the first academic program of anesthesiology in the country. Dr. Ralph Waters would go on to train the first residents in anesthesiology who would disperse across the country and establish their own anesthesiology programs at various medical schools.

Along with propagating anesthesiology throughout the country, Dr. Ralph Waters and the UW Department of Anesthesiology were instrumental in spreading academic anesthesiology throughout the world. With the culmination of World War 1 and World War 2, the world was becoming increasingly inter-connected; the medical field used this connectivity to share treatments, protocols, ideas and more from one country or hospital to the next. Anesthesiology was in its infancy in the United States, while in other countries its defined utilization was lagging even further behind. Dr. Waters helped legitimize and strengthen the profession of anesthesiology as seen from the perspective of the entire medical field and increased its respect throughout the world. To do this, Dr. Waters trained, as both residents and short-term visitors, several foreign trainees during his time at the UW Department of Anesthesiology from 1927-1948. He accepted as many as feasible even with the increasingly cramped living conditions in Madison and the increasing amount of US applicants to his program. Even when the foreign trainees were supposed to only have short term training, he’d argue for extended time especially if they were to return to their home countries and start their own anesthesiology programs. Several of his foreign trainees established departments of anesthesiology in their home countries and went on to train the first generation of anesthesiologists of their country. Other foreign trainees opted to remain in the US and practice at hospitals throughout the country. Dr. Waters impact on the field of anesthesiology and its’ spread throughout the world is easy to see, his attitude about the worldwide dissemination of anesthesiology can be summed up in a quote to one of his foreign applicants, “It is my hope that all parts of the world may come to have a better understanding of anesthesia and anything that I may do to bring that about, I wish to do.”

OBJECTIVE:

The aim of our study was to investigate the establishment of the Department of Anesthesiology at UW by Dr. Ralph Waters and his subsequent mentorship and promotion of foreign trainees in anesthesiology though exchange of trainees in the Department of Anesthesiology that would promote the spread and development of
anesthesiology internationally.

METHODS:

We performed our search for primary documents at the archives at UW-Madison Steenbock Library. In the Archives, we sorted through the collection of hundreds of records of the Department of Anesthesiology of the University of Wisconsin Medical School. These documents included letters between Dr. Waters and other recruiters and the trainees, applications, legal documents, handwritten thank you notes, and others. All are original documents. In this collection we chose the series 12/4/3 which pertained to Ralph Waters. In this series we picked boxes 2, 3, 20, and 21. We focused on folders labelled Residents Accepted and Applicants. We combed through the documents searching specifically for any foreign applicants, residents or any communication pertaining to international students. We narrowed our focus to people applying internationally who were non-US citizens. When documents were found matching those descriptions they were photographed and uploaded as a PDF image to a google drive. In the google drive the documents were organized by applicants vs. residents accepted and a separate folder was made for every applicant and resident. The documents were all given a standard format title of: YYYY_MM_DD_AuthorToRecipient. This made it easier to read the documents chronologically. And lastly, a summary document was made for each applicant and resident to describe the correspondence contained in the primary documents.

RESULTS:

In our search for primary documents we found over 300 pieces pertaining to international applicants or residents. There were no records from between 1940-1944 presumably because of the war. 35 individuals were identified between the years of 1932 and 1948, 19 trained at UW with Dr. Waters. Of those 16 that didn’t train at UW, 7 were accepted by Waters but were unable to attend for other reasons. This means that a total of 26/35 (74%) of international applicants to the department of anesthesiology at UW Madison were accepted for training. The most frequent country of origin for foreign trainees was Canada but other countries include: Uruguay, India, Brazil, China, Sweden, Colombia, Mexico, Chile, Peru, Norway, Denmark, Belgium, and England. Sweden and Brazil both had the 2nd most foreign applicants. Notable trainees include Dr. Carlos Pereira Parsloe who helped develop the field of anesthesiology in Brazil, Dr. F. A. D. Alexander who returned to Canada to lead a new department of anesthesiology, and Dr. Alfredo Pernin who helped lead anesthesiology in Uruguay. The next part of our study included a literature search to find what each trainee contributed to in terms of research and leadership later in his or her academic career.

CONCLUSIONS:

Dr. Waters mark on anesthesiology can be seen throughout the world. He intentionally accepted a large number of foreign trainees so that anesthesiology techniques could spread across the world. He was a passionate teacher and clinician who did everything he could to impart knowledge to the next generation. His students could be found across the country and across the world, in newly established departments helping train the modern anesthesiologists.
Delays in Treatment for T3/T4 Oropharyngeal Squamous Cell Carcinoma

Phillip Kubica; David O. Francis, MD MS; Tiffany Glazer, MD

BACKGROUND: Oral squamous cell carcinoma (OSCC) frequently presents in a late stage at diagnosis and surgery remains the preferred method of treatment. Without it, OSCC behaves aggressively with local invasion and metastasis. Recurrence occurs in approximately 30% of all OSCC cases (Son et al. 2018 Clinical Otolaryngology). One proposed risk factor is diagnostic delay – prolonged time between diagnosis and treatment. The hypothesis is that time from diagnosis to treatment allows tumor to grow and change in stage depending on the time interval, which increases likelihood of recurrence. This investigation aims to understand what the causes of diagnostic delay are and what the association is between diagnostic delay and outcomes; defined as higher recurrence rates.

OBJECTIVE: The aim is to elucidate understand the factors leading to treatment delay so that we can develop interventions to shorten time to treatment.

METHODS: We conducted a retrospective chart review of all 74 patients treated for T3 or T4 OSCC between January 1, 2014 and December 31, 2016. REDCap database was used in collecting all patient data. Time-to-treatment was defined as surgical date minus diagnosis date. Patients were divided into “no recurrence” and “recurrence” cohorts and the time-to-treatment was compared using chi-square and Kruskal Wallis tests where appropriate.

RESULTS: Of the 74 patients in the study, half did not experience recurrence 2-years post-treatment (n=37) and half recurred (n=37). All patients were Caucasian and had similar median ages (no recurrence: median 69 (interquartile range [IQR] 63-75); recurrence: 67 (IQR 61-77); p=0.90) and sex distribution (no recurrence: % male 57%, recurrence 64%) Longer median time to treatment was associated with higher rates of recurrence (no recurrence 34 days (IQR 27-41) v. 41 days (IQR 34-47; p=0.03)).

CONCLUSIONS: Delays in treatment was associated with higher recurrence rates in advanced OSCC. Stepwise multivariable regression analyses will be performed to determine what factors were associated with increased time-to-treatment, so that interventions can be designed to improve time to treatment.
POSTER 46

TITLE: Is screening positive for sleep apnea associated with a higher rate of miscarriage?

NAME: Jeannette M Larson

Background:

Miscarriage is a common and devastating adverse pregnancy outcome. Obstructive sleep apnea (OSA) is a form of sleep-disordered breathing characterized by airway collapse, resulting in hypoxemia. OSA in pregnancy has been shown to have associations with pregnancy complications such as gestational hypertension and preterm birth.

Objective:

The purpose of this study was to evaluate whether positive questionnaire-based screening for obstructive sleep apnea (OSA) was associated with higher rates of miscarriage (SAB).

Methods:

Secondary analysis of a prospective observational study of participants enrolled in an OSA screening study between 2010–2012. A screening questionnaire with standard Epworth (ESS), Berlin (BQ), and novel items was administered at a prenatal care visit. The results of women who completed the survey in the first trimester were assessed for association with SAB; the results of women who completed the survey at any time during pregnancy were assessed for association with a history of SAB.

Results:

In a cohort of 213 women screened in the first trimester, 30% (n=64) had elevated BQ or ESS scores, 18.8% (n=40) had high ESS scores and 14.6% (n=31) had elevated BQ scores suggestive of risk of OSA. 3.29% (n=7) had high ESS and BQ scores. As shown in figure 1, women who had both elevated ESS and BQ scores in the first trimester were more likely than women who had elevated scores on one or neither questionnaires to experience SAB (p=0.018). Women who reported snoring (p=0.042) or hypertension (0.013) in the first trimester were more likely to experience SAB than women who did not. In contrast, women who reported napping in the first trimester were less likely to experience SAB than women who did not (p=0.045). A history of SAB in a prior pregnancy was more likely in women who had elevated ESS or BQ scores at any time during pregnancy (n=370 of 1237), (36.2% vs. 29.5%, p=0.020); those who napped (34.7% vs. 29.1%, p=0.037), and those whose snoring bothers others (46.6% vs. 30.3%, p=0.004).

Conclusions:

Elevated BQ and ESS scores are statistically significantly associated with SAB. Snoring, naps and hypertension were the only individual questions from the BQ and ESS with statistically significant associations with SAB. Positive screening questionnaires for OSA, snoring that bothers others, and napping were associated with a prior history of SAB. Further investigation into this topic is warranted.
POSTER 47

TITLE: Is screening positive for sleep apnea associated with adverse pregnancy outcomes or excess gestational weight gain?

NAME: Jeannette M Larson

Background:

Obstructive sleep apnea (OSA) is rarely screened for during pregnancy, but it has been associated with hypertensive disorders of pregnancy.

Objective:

The purpose of this study was to evaluate specific questions with in commonly used OSA screening tools for association with other adverse pregnancy outcomes.

Methods:

A screening questionnaire with standard Epworth Sleepiness Scale (ESS), Berlin questionnaire (BQ), and novel items was administered at the time prenatal care (2010-2012). Gestational weight gain was calculated using the 2009 IOM recommendations and adjusted for pre-pregnancy BMI and gestational age at delivery.

Results:

In a cohort of 1237 women, 29.9% (N=370) had elevated BQ or ESS scores during pregnancy. Women who had elevated BQ or ESS scores were more likely to have an adverse composite obstetric outcome (CoOB) than women who screened negative (56.2% vs. 48.5%, p=0.013) and to have excess gestational weight gain (GWG) (45.1% vs. 37.8%, p=0.021). Upon analysis of screening items, women who reported snoring were more likely to have cesarean births (37.1% vs. 29.9%, p=0.012) and to have excess GWG (50.8% vs. 37.2%, p<0.001). Women who reported snoring more than three times per week were more likely to have excess GWG (53.8% vs. 38.2%, p=0.001), and adverse CoOB (60.0% vs. 49.7%, p=0.022); those with snoring loud enough to bother others were more likely to have excess GWG (55.1% vs. 39.2%, p=0.009). Women with chronic hypertension were more likely to have excess GWG (52.6% vs. 39.0%, p=0.019) and adverse CoOB (83.1% vs. 48.3%, p<0.001).

Conclusions:

Pregnancies at risk of OSA had higher incidence of adverse pregnancy outcomes, including excess GWG. Of the questions included in the BQ and ESS, questions about snoring and hypertension were statistically significantly associated with adverse pregnancy outcomes. Metabolic dysregulations associated with OSA may be a cause of excess GWG, leading to significant morbidities, such as fetal macrosomia and postpartum weight retention.
POSTER 48

TITLE: Is shift work or self-reported short sleep duration during pregnancy associated with adverse pregnancy outcomes?

NAME: Jeannette M Larson

Background:

Shift work has been associated with adverse pregnancy outcomes such as preterm delivery, hypertensive disorders of pregnancy, and infants of small for gestational age.

Objective:

The purpose of this study was to evaluate the association between shift work, sleep duration, and adverse pregnancy outcomes.

Methods:

Secondary analysis of a prospective study of participants enrolled in an OSA screening study (2010 – 2012). A screening questionnaire with standard OSA questions as well as novel items about shift work and nocturnal sleep duration was administered at the time of prenatal care. Short sleep duration (SSD) was defined as less than 7 hours. Prolonged sleep duration (PSD) was defined as greater than 9 hours. Normal sleep duration (NSD) was defined as 7-9 hours.

Results:

In a cohort of 1163 women, 12.2% (n=142) reported shift work at the time of screening. Women who reported shift work were more likely than women who reported no shift work to have preeclampsia (PreE) (27.0% vs. 12.7%, p<0.001), PreE with severe features (16.1% vs. 8.2%, p=0.003), A2 gestational diabetes mellitus (GDM) (21.9% vs. 14.1%, p=0.016), and adverse composite obstetric outcomes (CoOB) (58.9% vs 49.3%, p=0.033). 5.07% (n=61) of women reported SSD and 37.71% (n=454) of women reported PSD. Women who reported SSD were more likely than women who reported NSD or PSD to have GDM (31.1% vs. 24.9% and 13.9%, respectively, p<0.001) and A2 GDM (29.55 vs. 17.7% and 10.1%, respectively, p<0.001). Women who reported PSD were less likely to experience adverse CoOB than women who reported NSD or SSD (43.8% vs. 54.1% and 57.4%, respectively, p=0.002).

Conclusions:

Shift work is associated with PreE with and without severe features, A2 GDM, and adverse CoOB. Short sleep duration is associated with GDM and A2 GDM. Prolonged sleep duration is associated with lower adverse CoOB. This is in contrast to recent findings. Further research on sleep disturbance in pregnancy is warranted.
POSTER 49

TITLE: Is sleep deprivation associated with adverse pregnancy outcomes?

NAME: Jeannette M Larson

Background:
In the general population, sleep deprivation has been associated with metabolic dysregulation, inflammatory processes, and increased mortality. During pregnancy, sleep deprivation has been associated with preterm delivery, intrauterine growth restriction, and hypertensive disorders of pregnancy.

Objective:
The purpose of this study was to evaluate the association between measures of sleep deprivation (SD) and adverse pregnancy outcomes.

Methods:
A screening questionnaire with standard Epworth and Berlin items as well as novel items about sleep duration and drowsy driving was administered at the time of prenatal care; this was a secondary analysis of participants enrolled (2010-2012). SD was defined as a 3 hour or more difference between weekday and weekend self-reported sleep duration. Questions about drowsy driving and naps were included to assess SD.

Results:
In a cohort of 1172 women, 17.41% (n=204) of women had SD. Women with SD were more likely than to have large for gestational age (LGA) babies (6.5% vs. 2.99%, p=0.015) and to have babies that were admitted to the neonatal intensive care unit (NICU) at birth (21.1% vs. 15.4%, p=0.048). Women who reported falling asleep while driving were more likely than women who did not report falling asleep while driving to have gestational hypertension (gHTN) (18.6% vs. 9.3%, p=0.030), preeclampsia (PreE) (27.1% vs. 13.8%, p=0.010), PreE with severe features (18.8% vs. 8.68%, p=0.017) and to experience adverse composite obstetric outcomes (CoOB) (64.7% vs. 50%, p=0.040). Women who reported napping were more likely to have PreE with severe features (11.1% vs. 7.59%, p=0.049), preterm birth (PTB) (16.6% vs. 9.71%, p=0.001), and NICU admission (20.9% vs. 14.4%, p=0.005). Women who reported napping more than 3x/week were more likely to have gHTN (12.0% vs. 8.12%, p=0.024), PTB (16.0% vs. 10.3%, p=0.003), and to experience adverse CoOB (54.0% vs. 48.3%, p=0.047).

Conclusions:
Sleep deprivation is associated with having an LGA baby and having a baby admitted to NICU. Falling asleep while driving is associated with gHTN, PreE, and adverse CoOB. Napping is associated with PreE with severe features, PTB, and NICU admission at birth. Napping >3x per week is associated with gHTN, PTB, and adverse CoOB. Further research into the effects of sleep deprivation during pregnancy is warranted.
POSTER 50

TITLE: Adult Adoptees Interest in, Perceptions of, and Motivations for Genetic Testing

NAME: Micah Larson

BACKGROUND: Adoptees comprise 2.5% of the US population. They constitute a patient population whose needs may not be met by current healthcare practices because of lack knowledge about their family history. Limited family history knowledge is potentially detrimental to one's health as family history is a common risk assessment tool. Although not a replacement for family history, genetic/genomic testing may provide adoptees with information about heritable health risks that is otherwise unavailable to them. Adoptees perceptions about the value of genetic/genomic testing is invaluable to the consideration of implementation of any such testing programs.

OBJECTIVE: Creation of a survey informed by a literature review to evaluate adoptees' level of interest in genetic/genomic testing and determine the motivations behind this interest. This survey will also evaluate adoptees' interest in clinical services that specialize in genetic/genomic issues related to adoption.

METHODS: We conducted a narrative literature review through PubMed, Scopus, Web of Science, and CINAHL to answer the question: What value and risks do adoptees, adoptive parents, and clinicians see in genetic/genomic testing of adoptees? Included articles were restricted to English-language articles published after 1990. Additional articles were found by scanning bibliographies. Themes identified in the literature were used to create questions about motivating factors in the survey.

RESULTS: The initial literature search yielded 1990 results, and 59 of these were selected for full text review. 40 additional articles were found via bibliographies. 30 articles were ultimately included.

CONCLUSIONS: Research on adoptees' perceptions and experiences of genetic testing has been limited to small interview-based studies and analysis of adoptee subsets of studies of the general population. A survey designed specifically to evaluate the motivations of adoptees for genetic/genomic testing that expands on the themes identified in previous studies is an important next step. The survey created based on this literature review asks respondents to rate motivations for genetic testing on a unipolar likert scale from "not at all important" to "extremely important." All of the motivating factors included in the survey are drawn from themes identified in the literature. The survey will be administered online to young adult adoptees and a control (non-adopted age-matched) group.
POSTER 51

TITLE: Identifying prognostic variables for improved overall survival of mRCC patients treated with cytoreductive nephrectomy

NAME: Kate Lauer

BACKGROUND
Cytoreductive nephrectomy (CN) is a standard of care for select metastatic renal cell carcinoma (mRCC) patients, but the improvement of systemic therapies has led to re-evaluation of how patients are selected for CN. Multiple prognostic factors have been described, and recent studies suggest that patients classified as intermediate or poor risk by the international metastatic disease consortium (IMDC) model may not benefit from surgery because of a higher probability of early mortality. However, many of these studies include few patients and data from single institutions, limiting the generalizability of the findings.

OBJECTIVE: The purpose of this study was to evaluate variables associated with overall survival (OS) for mRCC patients treated with CN to identify prognostic factors for early mortality after CN.

METHODS
A retrospective chart review of 1103 mRCC patients who underwent CN between 2006 and 2018 at five independent centers was performed. Patients were classified using the IMDC criteria to compare OS using the field’s current risk stratification model. Univariate Cox hazard ratios identified variables associated with lower OS. Patients were stratified into OS groups of <6 mo (n=142, 13%), <12 mo (n=294, 27%), and >12 mo (n=809, 73%) from surgery to identify those with early mortality and characterize trends in variables identified by the Cox analyses.

RESULTS
The OS range in months for all mRCC patients (n=1103) was 1-159, with medians for all/deceased/alive patients of 23/23/33. IMDC intermediate risk OS (n=726) ranged from 1-159 (M=24/23.5/34), compared to 1-116 (M=18/18/30) for the poor risk group (n=296).

Univariate Cox hazard ratios identified 14 variables associated with lower OS. The differences between groups, reported as percentages of <6/<12/>12 mo OS patients and p-values compared to the >12 mo group, were largest for pre-op hemoglobin<LLN (81/80/61, p<0.001), albumin<LLN (35/34/17, p<0.001), platelets>ULN (24/19/11, p<0.001), and calcium>10 (19/16/11, p=0.009/0.06), as well as sarcomatoid features (39/33/15, p<0.001), weight loss (31/29/20, p<0.001), retroperitoneal adenopathy (54/52/35, p<0.001), and symptomatic primary tumor (71/69/61, p=0.02/0.007).

CONCLUSIONS
IMDC risk stratification of mRCC patients results in variable ranges of OS and does not reliably identify strong or exclude poor CN candidates. Several of the identified prognostic variables will be developed into a model to estimate risk of early mortality.
POSTER 52

2D and 3D Transthoracic Echo Offers Acceptable Real-Time Visualization of Heart Valves During Transcatheter Interventional Procedures

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Background: Most transcatheter heart valve (THV) procedures are guided by trans-esophageal echocardiography (TEE) to visualize heart structures and non-bony tissues. However, TEE requires endotracheal intubation and general anesthesia. In comparison, transthoracic echocardiography (TTE) requires no general anesthesia, offers multiple comprehensive views and is inexpensive. Recent advances in TTE probe design may make it feasible for continuous intra-procedural visualization during THV cases. Previous studies in this laboratory have been performed on young, healthy subjects and certain TTE acoustic windows were considered satisfactory to guide THV procedures. The purpose of this study is to investigate whether the quality of TTE imaging in adults with structural heart disease would be clinically acceptable to guide an aortic or mitral valve intervention.

Objective: We hypothesize that 2D and 3D TTE offer satisfactory visualization of aortic and mitral valves in individuals with structural heart disease to guide THV interventions.

Methods: Real-time 2D and 3D TTE imaging were recorded in supine patients with structural heart disease after undergoing THV procedures. Images from each subject were presented to interventional echo-cardiologists. Reviewers assigned a grade to each image using a four-point grading scale (1-excellent, 2-good, 3-sufficient, 4-insufficient), where each grade reflects a composite of image quality, anatomic clarity and acceptability to guide a THV procedure.

Results: A total of twenty-four interventional subjects were graded. For native 2D images, a parasternal long axis view achieved the highest proportion of sufficient or better grades for mitral and aortic valves (87% and 70%, respectively). Compared to 69% of all native 2D images, only 31% of native 3D images were rated sufficient or better. However, 2D views derived from 3D volumes (cut-plane and quasi-2D images) had higher proportions of sufficient grades than the native 3D volumes.

Conclusions: In this evaluation, 2D and 3D TTE imaging appears to offer satisfactory visualization of the mitral and aortic valve in supine individuals being treated for structural heart disease. The 2D parasternal long acoustic window was the most optimal for viewing both mitral and aortic valves. These findings may help integrate TTE, and possibly TTE/X-ray fluoroscopy co-registration, into the workflow for real-time image guidance for transcatheter valve interventions in the future.
POSTER 53

Greater Proportion of Acute Hamstring Strain Injury in the Stronger, Larger limb in Collegiate-Level Athletes
Daniel Liu

Background
Current literature presents inconsistent information describing risk factors for hamstring strain injury (HSI). Strength asymmetry, although described in many ways, generally confers increased risk for HSI with a deficit in strength of the involved limb. Muscle mass has been associated with strength, but the influence of muscle volume and strength with HSI risk is unexplored.

Objective
This study observes hamstring strength and volume in athletes with HSI, hypothesizing a greater proportion of HSI in the weaker, smaller limb.

Methods
A retrospective analysis with prospectively collected data from athletes who suffered an HSI between 2017-2019 was done. Baseline eccentric strength was assessed with Nordic curl at the start of the season. Volume data was obtained from manual segmentation of the hamstrings at time of injury (TOI) using T1-weighted magnetic resonance images. The injured limb (inv) was dichotomously categorized based on relative strength and volume compared to the uninvolved (uninv) limb (stronger or weaker, larger or smaller).

Results
Twenty-nine Division I collegiate athletes were included in this analysis (19.9±1.3 years; 23M/6F). Twenty athletes injured their stronger limbs (inv 1194.4±268.3cm³, 428.0±89.1N; uninv 1134.8±233.2cm³, 387.9±95.1N), and nineteen athletes injured the limb with larger volume (inv 1249.6±222.8cm³, 419.1±94.0N; uninv 1160.1±211.0cm³, 399.1±90.9N). When considering both strength and volume, twelve athletes injured their stronger, larger muscle (inv 1334.9±185.5cm³, 455.2±94.5N; uninv 1219.0±197.1cm³, 408.9±108.7N), two injured their weaker, smaller muscle (inv 1240.7±83.8cm³, 328.5±33.2N; uninv 1288.6±106.3cm³, 369.3±6.6N), seven injured their weaker but larger muscle (inv 1103.3±215.4cm³, 357.2±55.3N; uninv 1059.0±208.3cm³, 382.3±50.8N), and eight injured their stronger but smaller muscle (inv 983.8±238.3cm³, 387.2±65.8N; uninv 1008.6±236.9cm³, 356.4±64.0N).

Conclusions
A higher proportion of acute HSI is observed in the limb with a larger and/or stronger hamstring relative to the uninvolved limb. In contrast to previous research, these findings suggest increased strength and/or volume is a possible contributing factor for HSI. Relative hypertrophy and strength increase could reflect a greater demand or reliance of the involved limb during activity, which may predispose that limb to HSI. Future work will investigate the influence of previous HSI on hamstring strength and volume of the injured relative to the uninvolved limb.
References


Validation of a Novel Methodology for Measurement of Prognostic Marker Total Kidney Volume in Polycystic Kidney Disease

Fan-Jean Liu

Background: Total kidney volume (TKV) is the best predictor of kidney disease progression in autosomal dominant polycystic kidney disease (ADPKD) and helps clinicians employ disease modifying therapy early in disease course to delay need for dialysis. A novel semi-automated planimetry technique using 3D images from CT/MRI was devised at UW for measurement of TKV (3D-TKV).

Objectives: Evaluate agreement between 3D-TKV and the validated manual technique of calculating TKV using the ellipsoid equation (E-TKV).

Methods: We assessed all abdomen CT (with contrast) and MRI scans available on UW PACS that displayed entire kidneys of serial ADPKD patients seen at UW PKD Clinic between 6/2018 and 2/2019 (N=106). E-TKV was calculated using coronal and sagittal lengths, axial height and width measured on UW PACS. 3D-TKV was measured using GE Advantage Workstation v4.6. Correlation between 3D-TKV and E-TKV measurements was evaluated using linear regression. Percent agreement for 3D- and E-TKV based Mayo ADPKD classification was evaluated.

Results: A total of 87 abdomen scans from 63 ADPKD patients fulfilled study criteria. Median age at the time of imaging scan was 42 years (IQR 33-57). 54% were women and 85% identified as Caucasian. Median serum creatinine was 1.05 mg/dL (IQR 0.82-1.04). The linear regression between 3D-TKV and E-TKV had excellent agreement with R^2 of 0.9561 (p<0.001; N=86). We found that 3D-TKV was equal to 0.913 x E-TKV + 83.513. Percent agreement between 3D- and E-TKV based Mayo classification was 84% (73/87). A total of 7 scans (8%) classified 1 class higher and 7 (8%) classified 1 class lower on 3D-TKV. Notably, 14% (3/21) with Mayo class 1B on E-TKV were classified as 1C on 3D-TKV and 14% (3/22) with Mayo class 1C on E-TKV were classified as 1B on 3D-TKV. The median time to calculating 3D-TKV was longer but still efficient (14.8 min/scan vs 4.7 min/scan for E-TKV; p<0.0001).

Conclusion: 3D-TKV is a valid semi-automated methodology that may be utilized for patient care in ADPKD. Our findings recommend: (a) comparison of intra-and inter-observer variability in 3D-and E-TKV and, (b) comparison with gold standard manual planimetry, as final steps in validation of 3D-TKV. Our findings also suggest attention to clinical and genetic prognostic markers in patients with 1B or 1C ADPKD for decisions about disease modifying therapy.
**POSTER 55**

**TITLE:** Identifying Risk Factors for Race Day Medical Incidents at Endurance Running Events

**NAME:** Lianna Mack, Stephanie Kliethermes PhD

**BACKGROUND:** Approximately 18.1 million people participated in road races in the United States in 2018. Despite high participation, much of the published medical event data comes solely from a few large marathons. Current research lacks information that is generalizable to small- and medium-sized races at a variety of race distances.

**OBJECTIVE:** To identify risk factors for medical incidents at endurance running events and provide guidelines for medical race directors and participants to make appropriate decisions regarding race day safety based on the size of their race.

**METHODS:** Medical race directors were recruited to participate in a nationwide survey. Data was collected on race distance, size, weather, medical preparation, and injuries. Races shorter than 10 kilometers or longer than 26.2 miles were excluded. Races were grouped based on number of participants (small <1,000 runners; medium 1,000-5,000; large >5,000 runners). The number and incidences of participants treated, medical staff, and AEDs available were calculated, as was the association between weather conditions and medical incidents.

**RESULTS:** A total of 20 medical directors completed the survey. Data from 13 marathons (41,726 participants) and 15 half marathons (40,057 participants) were collected. In small and medium half marathons, the treatment rate was 8.7/1,000 runners compared to 2.9/1,000 in large halves. There were approximately 12.3 medical team staff per 1,000 runners in small/medium halves and 28.6 staff per 1,000 runners in large halves. In small and medium marathons, the treatment rate was 54.1/1,000 runners compared to 71.8/1,000 in large marathons. Small/medium marathons had approximately 56.6 medical team staff per 1,000 runners compared to 62.3 staff per 1,000 in large marathons. Both marathons and half marathons had 3.0 AEDs/1,000 runners. All large races had cooling methods, IVs, point of care (POC) labs, and AEDs available. Of medium and small races, 18 (81.8%) had cooling methods; 14 (63.6%) IVs; 9 (40.9%) POC labs; and 20 (90.9%) had AEDs. No association between wet bulb globe temperature (WBGT) and finishing rate (p=0.918) or number of medical incidents (p=0.268) was found.

**CONCLUSIONS:** Marathons had higher rates of treatment than half marathons and also provided larger medical teams. WBGT did not have a significant impact on finishing or injury rates. It is important that participants and medical directors are aware of these findings to better promote safety at race events.
POSTER 56

TITLE: Understanding the Other: A Qualitative Comparison of How Long Term Care and the Emergency Department Nurses Perceive the Other Side

NAME: Elizabeth Maginot, BS, University of Wisconsin School of Medicine and Public Health
Co-Authors: Rebecca Schwei, MPH, Luke Valmadrid, BS, Michael Pulia, MD, MS, Department of Emergency Medicine, UW SMPH

BACKGROUND: In the United States, there are 47.8 million older adults which makes up 14.9% of the population.¹ Long-term care facilities (LTCF) are a major source of health services with nearly 50% of the older adult population receiving support and treatments in LTCF at least once in their lifetime.² Although each year nearly 25% of LTCF residents are transferred to an ED, the intersection between LTCFs and emergency departments (ED) has not been heavily investigated.³ Given the high workload that is common of the ED setting, older adults that present to the ED are at increased risk for adverse events during their visits when compared to their younger counterparts.⁴ ED and LTCF Nurses are at the frontline of coordinating care between these two settings but yet exist in vastly different work environments.⁵,⁶ Perceptions and biases between groups can inhibit efficiency between the work settings.⁷ Understanding and breaking down these perceptions between ED and LTCF staff could illuminate barriers to care for LTCF patients in the ED.

PURPOSE: The purpose of this study was first to describe the perceptions that nursing staff have regarding the ED and LTCF settings and second, to describe the perceptions about caring for LTCF residents in both the ED and LTCF settings.

METHODS: A total of 22 interviews were conducted with LTCF (n=16) and ED nursing staff (n=6). Interviews were recorded, transcribed verbatim, and then underwent directed content analysis using a systems engineering for healthcare model. A parallel inductive content coding process was also utilized to identify emerging themes.⁸ For project, we focused on codes that pertained to perceptions between the two care settings.

RESULTS: Two distinct domains emerged: (1) perceptions on care setting and (2) perceptions on patient care. With perceptions on care setting, ED nurses described how they perceived that LTCFs have a high patient to staff ratio. LTCF nurses perceived the ED as fast pace, that ED staff has pressure to find something wrong, and that older adults do not receive the same care in the ED as other patients. With perceptions on patient management, ED nurses perceived that LTCF residents were sometimes inappropriately sent to the ED and that LTCF staff did not know their patients. LTCF nurses perceived that the ED staff often fail to address the reason for transfer, perform excessive testing, and did not have a good understanding of the documentation required to guide post-ED care in the LTCF.

CONCLUSION: A variety of negative perceptions exist about the other setting between LTCF and ED nurses. Increased education on the management of LTCF residents in each setting is needed to break down barriers between the ED and LTCF and optimize care.
TITLE: In vitro assessment of cooperative interaction between radiation and ATM inhibitor in melanoma model

NAME: Elian Massoud

BACKGROUND: Cancer immunotherapy is a promising therapeutic strategy that facilitates cancer regression using the body’s own immune system. Radiation therapy (RT) may enhance response to certain immunotherapies through an in situ tumor vaccination effect, whereby a tumor is converted into a nidus for enhanced immune recognition of tumor-specific antigens. RT achieves this by interacting with the local tumor-immune microenvironment to induce immunogenic tumor cell death and phenotypic changes in the tumor cell immune susceptibility of surviving tumor cells via activation of a type I interferon response.

OBJECTIVE: Both RT and the ATM kinase inhibitor AZD0156, have a capacity to elicit unrepaired DNA damage and this may contribute to immunogenic cell death and activation of a type I interferon response via the cGAS/STING pathway. Here, we tested the hypothesis that, by accentuating these effects, a combination of RT and AZD0156 would elicit a greater in situ vaccine effect than either of these treatments alone.

METHODS: We examined the direct effect of AZD0156 on tumor cell radiosensitivity using in vitro clonogenic assays. In order to assess the effect of these treatments on activation of a type I interferon response, qPCR was performed to quantify the gene expression of INF-β and other markers of tumor cell immune susceptibility. Using flow cytometry, we evaluated the effect of RT and/or AZD0156 on the activation of tumor infiltrating CD8+ T cells by quantifying expression of CD25, CD69, GZMB and IFN-γ.

RESULTS: Preliminary data from clonogenic assays indicated that AZD0156 enhances the sensitivity of tumor cells to radiation, predicting an increase in immunogenic cell death with the combination of this agent and RT. In addition, among surviving tumor cells, RT and AZD0156 show cooperative efficacy in activating a type I interferon response and enhancing tumor cell immune susceptibility, as gauged by expression of INF-β and MHC class I. Despite these observations, preliminary flow cytometry performed on disaggregated tumor specimens 3 days after RT do not show a statistical difference in the level of T cell activation following combined treatment, as compared to RT alone.

CONCLUSIONS: These data suggest a degree of cooperative interaction between ATM kinase inhibition and RT, by altering tumor cell gene expression and increasing the tumor cells sensitivity to RT. It remains unclear whether these effects influence the anti-tumor immune response.
Detection of tumor-specific antigens in mice cured of B78 melanoma by immunotherapy

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Background
We’ve utilized a peptide array to identify protein-targets recognized by antibodies that are activated in mice cured of melanoma through our immunotherapy regimen. Nimble Therapeutic’s array technology enabled us to identify linear epitopes from the entire mouse proteome using antibodies present in these cured mice. Human peptides found in the clefts of HLA molecules on neuroblastoma, a cancer of neuroectodermal origin (like melanoma), have been identified elsewhere [3]. We identified a subset of murine melanoma antigens recognized by immune sera from these tumor-cured-mice that correspond to homologous human proteins with peptides found in the HLA of human neuroblastoma [3].

Methods
Mice with large B78 melanomas were treated with combination immunotherapy, curing the mice of their tumors and inducing long-term immune memory [1,2]. This therapy includes external beam radiation to the tumor and intratumoral injection of a tumor-specific anti-GD2 mAb linked to IL2. Serum was collected from naïve mice and mice after they were cured of large tumors and rejected re-challenge of a similar tumor. Sera from multiple cured mice were used on an array of ~8.5x10^6 peptides (~55,000 proteins) to determine specific antibody binding sites. The 264 peptides reported in the HLA of neuroblastomas [3] were aligned to their human proteins, and then their homologous murine proteins were analyzed for reactivity with the melanoma-immune mouse sera detected by the peptide-array, using MAFFT Multiple Sequence Alignment [4].

Results
We compared antibody binding by the naive and immune sera to the peptide array. Approximately 2000 murine proteins exhibited strong antibody binding by immune sera. Of these, 10 were homologous to human proteins identified in neuroblastoma HLA molecules. After ensuring antibody binding by multiple mice, 3 proteins remain as candidates for further investigation. They are Contactin-associated protein-like 2 (Cntnap2), Cyclin-dependent kinase 1 (Cdk1) and Protein EFR3 homolog B (Efr3b).

Conclusions
We identified murine proteins that were selectively recognized by antibodies in mice that were cured of a tumor with immunotherapy but not by sera from naïve mice. We found that some of these are homologous to proteins that appear to be human neuroblastoma antigens. These candidates will be explored as potential new targets for antibody-based therapies and could help in the development of new treatments or might be used as a biomarker for response.

2. Morris ZS, et al. Cancer Immunology Research, Published online, May 2018


TITLE: MRI Analysis of Edema Volumes in Collegiate Athletes following Hamstring Strain Injuries
NAME: Anna McGee

BACKGROUND: Hamstring strain injuries (HSI) are amongst the most common sports-related injuries with recurrence rates measured as high as 33%. The majority of these re-injuries occur within the first month of return-to-sport (RTS) suggesting a gap in our understanding of rehabilitation and recovery. There may be a role for more objective measures of recovery like magnetic resonance imagining (MRI), but knowledge on their prognostic ability is limited.

OBJECTIVE: The objective of this study was to evaluate the relationship between muscle edema visible on MRI at time of injury (TOI) and RTS following HSI among college athletes.

METHODS: This longitudinal, prospective study consisted of collegiate student athletes who sustained an HSI confirmed by a clinician and requiring time away from their sport. T1 and T2 weighted MRIs were conducted at TOI and RTS. Manual segmentation of the T1-weighted images was used to identify anatomical boundaries of the hamstrings to generate 3D contours representing total muscle volume. Manual segmentation of the T2-weighted, fluid sensitive images were used to generate 3D contours of the volume of edema. Edema volumes were normalized to the total volume of the hamstring muscle group. A one way ANOVA between subjects was conducted to compare edema volumes at TOI and RTS. T-test was used to compare edema volumes and days to RTS.

RESULTS:
Of the 27 athletes who sustained HSIs (20M:7F; 20.1 ± 1.4 yrs), 6 had no visible edema at TOI. Among the 21 subjects with TOI edema, there was a significant decrease in the edema volumes from TOI to RTS (TOI: 7.35% ± 8.7%; RTS: 3.35% ± 7.1%; p<0.001) from TOI to RTS. Six of the 21 athletes with edema at TOI showed complete resolution of edema volume on MRI at RTS. There was no difference in RTS time between those with edema at TOI (22 ± 10.3 days) and those without (32 ± 18.5 days; p=0.065). There was no relationship between the volume of edema at TOI or RTS and days to RTS (R² = 0.03; pR²=0.001).

CONCLUSIONS: While the majority of athletes had objective measures of muscle injury on MRI, there was a small but significant group of athletes who meet clinical criteria for HSI but lacked edema at TOI. We found no different in recovery time among those with and without TOI edema nor was there any relationship between volume of edema and RTS time. This may suggest that RTS time is a poor measure of recovery or that other characteristics of the muscle injury play a more important role in recovery and may provide better measures of prognosis.
POSTER 60

Title: Reach and Representativeness of Electronic Referral of Primary Care Patients to an Evidence-Based Smoking Treatment

Name: Rosina Millevolte

Background: Effective smoking cessation treatments are underused and too rarely offered in primary care settings. Electronic referral via the electronic health record (EHR) may be an effective way to increase the reach of evidence-based smoking treatment.

Objective: To compare the reach of faxed referral to a state tobacco Quitline (FTQ) with electronic referral (eReferral) to intensive smoking reduction or cessation treatment and evaluate the representativeness of eReferral reach across patient groups (gender, age, race, ethnicity, insurance) in primary care.

Methods: Data are from a cluster-randomized trial in which adult primary care clinics in two integrated Midwestern healthcare systems implemented either FTQ (N=10 clinics, 6297 smokers) or eReferral to an intensive treatment offered in a research study (N=18 clinics, 33473 smokers). Chi-square analyses compared FTQ and eReferral treatment referral and enrollment rates among adult smokers and whether rates varied by patient characteristics and healthcare systems.

Results: A significantly higher proportion of adults who smoke were eReferred to an intensive research treatment (7812/33473, 23.3%) than were faxed referred to a Quitline (126/6297, 2.0%; Chi-square=1509.3, p<.001). A significantly higher proportion of those fax referred enrolled in treatment (57/126, 45.2%) than did those eReferred to intensive treatment (2257/7812, 28.9%, Chi-square=15.3, p<.001), but the reach of treatment (proportion of adults who smoked who engaged in treatment) was greater for eReferral (2257/33537, 6.7%) Vs. fax (57/6297, 1.2%, Chi-square=328.6, p<.001). eReferral rates differed by healthcare system, gender, race, ethnicity, age, and insurance, with elevated eReferral rates among women, African American, non-Hispanic, middle-aged, and Medicaid and uninsured patients.

Conclusions: EHR-based eReferral to intense smoking treatment had better reach than did fax referral to a Quitline and had relatively greater reach among groups at elevated risk for difficulty quitting, such as women, African American, and Medicaid-eligible or uninsured people who smoke.
Background: Percutaneous Renal Biopsies are considered the gold standard for the diagnosis, prognosis and management of renal diseases. As with all percutaneous procedures, they incur a bleeding risk, but major complications such as hemorrhage requiring transfusion are quite rare; being reported to occur in only 1% of all biopsies. The current recommendation for management of complications is a 24-hour observation period post-biopsy, and this is the protocol at University of Wisconsin Hospital. However, there isn’t a universal consensus surrounding the observation period, with some arguing that the recommendation is too long.

Objective: The objective of this project was to address the quality gap of the lack of consensus regarding the observation period. Along the way, we also hoped to answer the questions: are the kidney biopsies performed at UW hospital safe, is the 24-hour observation period both appropriate and efficient, and are there any factors that could be correlated with the risk of kidney biopsy complications?

Methods: This retrospective chart-review study looked at a 2-year log of patients who had kidney biopsies scheduled at UW Hospital. Using Epic/Health Link, we were able to collect the baseline information prior to biopsy (anthropomorphic measurements, medical history, indications for biopsy, baseline labs), the peri-biopsy report, and post-biopsy information (baseline labs and time of any complications). Specifically, complications were gleaned from any nursing or hospitalist notes from the time of biopsy until the time of discharge. An excel spreadsheet was used to organize the data, and to calculate average characteristics of the sample and to track the times at which complications occurred. It was important to separate complications into minor and major complications, with major complication including but not limited to gross hemorrhage, blood transfusions requirement, or surgical intervention requirement. Baseline characteristics and patient demographic information was summarized using proportions and Fisher’s exact tests. Continuous variables such as age, BMI and Charlson score were analyzed using t-tests. We modelled the incidence of complications using Kaplan Meier Incidence curves and a Poisson regression. Both a univariable and a multivariable Poisson model were conducted with variables deemed risk factors for complications. All p-values <0.05 were considered statistically significant. All analyses were conducted using STATA version 15 SE.

Results: Baseline characteristics of our sample of 154 biopsies were 52% male and 48% female, with an average age of 54.9(16.6) years average BMIs of 30.2(8.5) kg/m^2, and an average score of 3.69(2.48) on the Charlson co-morbidity index. Of the 154 biopsies, we had a 48% complication rate including both minor and major complications. However, major complications occurred only in 2 biopsies, or with a rate of 1.2% In addition, we found that 92% of all complications were observed within 12 hours post biopsy, and 100% of all major complications were observed within 8 hours post biopsy. When comparing baseline characteristics of those who had any complication, whether minor or major and those who had no complications, the complications group had statistically more patients with hematuria as an indication for biopsy. In addition, the complications group was statistically younger with an average age of 50.7(15.1) vs. the no complications group’s average of 58.9(17.1) (p=0.002). The complications group also had a statistically lower score on the Charlson co-morbidity index, with an average score of 3.16(2.2) compared to the no complications group’s average of 4.2(2.64) (p=0.008). When these characteristics were analyzed under univariable analysis, only age held up as statistically correlated with an increased risk of complications (IRR = 0.98; 95% CI: 0.97-0.99; p=0.03). However, when looked under multivariable analysis, no characteristics were held up as statistically significant.
Conclusions: Given that major complications occurred only 1.2% of the time, we can conclude that the renal biopsies performed at UW hospital are safe. The timing of complication observations leads us to conclude that the 24-hour observation protocol is appropriate, but not efficient, because 92% of all complications were observed within 12 hours, and 100% of major complications were observed with 8 hours post biopsy. Pursuing a shorter observation protocol and prospectively collecting data on complications would thus be an interesting future avenue to follow. In addition, since no characteristics help up as statistically correlated with an increased risk of complications, we cannot conclude to have found any characteristics that would accurately predict complications. However because the sample size of major complications is small, the absence of such predicting factors is not certain.
Background: There are over two million documented falls in elderly patients per year and makes up 10-15% of this age group’s total visits to the emergency department (ED). The evaluation in the ED often relies on the use of imaging modalities like x-ray and computed tomography (CT). CT has been shown to increase physician confidence in this evaluation, although physical exam may be adequate to make a diagnosis.

Objective: Determine the predictive value of chest pain (CP) and chest wall tenderness (CWT) for ground level fall patients ≥ 65 years old on chest x-ray (CXR) and CT-chest (CTC) ordering as well as actionable findings associated with this imaging.

Methods: Single center, retrospective chart analysis of elderly patients evaluated in the ED with a chief complaint of “fall” from 2015-2019 (n=9916). Exclusions included outside facility transfers and patients on hospice care or palliative care. A total of 1048 charts were randomly chosen and abstracted. Actionable findings included procedures related to chest injury, ICU admission, intubation, return visit to the hospital, use of supplemental oxygen or parenteral opioids outside of the ED, and >2 rib fractures.

Results: Of the 1048 patient encounters, 164 patients (15.7%) were found to have either CP or CWT. 799 CXRs (76.2%) and 256 CTCs (24.4%) were performed with 54 (5.2%) actionable findings and 30 (2.9%) CTC-novel findings (not found on CXR), respectively. Presence of CP or CWT did not impact CXR orders (OR 2.83, 95% CI 0.256-31.3 and OR 4.19, 95% CI 0.389-45.1, respectively) but increased CTC orders (OR 2.17, 95% CI 1.00-4.72 and OR 3.85, 95% CI 2.03-7.32, respectively). Odds of actionable findings (OR 7.99, 95% CI 3.40-18.7) and CTC-novel findings (OR 12.1, 95% CI 5.66-21.0) were increased for patients with CP or CWT and was not impacted by history of dementia or altered mental status. Patients without CP or CWT had a NPV of 97.9 and 98.9% and sensitivities of 72.2 and 66.7% for actionable and CTC-novel findings, respectively.

Conclusions: The use of CTC imaging for elderly patients without CP, CWT, or significant findings on a CXR may be low yield for the detection of significant chest injuries, including patients with dementia or altered mental status. However, CTC may prove useful in uncovering important findings for patients with reported CP or CWT on exam. This highlights the usefulness of using exam skills in stratifying patients with significant chest injuries after ground level falls.
Trends in Tuberculosis Morbidity and Mortality Over a Four-Year Period at a Tibetan Hospital in Northern India, 2015-2018

Peter Ngo

Background

Tuberculosis prevalence is high among the Tibetan refugees in India, with over half of all cases occurring in congregated settings such as schools and monasteries.

Objective

The objective of this study was to analyze trends in morbidity and mortality among documented tuberculosis (TB) cases at Delek Hospital in Dharamshala, India.

Methods

This study was a retrospective case review of documented TB cases at Delek Hospital between 2015-2018. We assessed demographic and temporal trends of TB cases and associated comorbidities amongst those diagnosed with standard TB and multi-drug (MDR) TB.

Results

A total of 670 cases of TB were documented over the four years. There was a significant decrease in total TB cases from 187 (2015) to 124 (2018). MDR cases in particular fell from 34 cases (2015) down to 12 (2018). People aged 14-25; males; and students had comparatively elevated rates of TB. MDR TB was highest in those aged 26-59. The proportion of students diagnosed with TB declined from 47% (2015) to 38% (2018). Rates of diabetes increased from 4.8% (2015) to 5.6% (2018), while rates of hepatitis B stayed relative the same (6.5%). Diabetes was seen in higher proportion in those with MDR-TB vs standard TB. Extrapulmonary infections in standard TB decreased from 41% (2015) to 23% (2018) with a majority being pleural effusions. On the other hand, MDR TB cases only had pulmonary sites of infection. Overall mortality rate decreased from 2.1% (2015) to 0.8% (2018).

Conclusion

Documented TB cases decreased substantially from 2015-2018 but remains an important cause of preventable mortality. Identification of disparities in demographics and comorbid conditions can inform strategies targeting subpopulations at risk for complicated TB infection.
POSTER 64

TITLE: Clinician’s Guide to Breast Cancer Screening in Older Women

NAME: Viktoria Ovsepyan

BACKGROUND: Age is the major risk factor for late-life breast cancer. Approximately 41% of all incident breast cancers and 57% of all breast cancer deaths occur among women aged 65 years and older, with breast cancer incidence peaking between the ages of 75-79. Screening mammography recommendations for older women are lacking because randomized trials did not include women over the age of 74. Observational data suggests that screening may be beneficial for older women with a life expectancy of over 10 years, since it takes about 11 years to prevent 1 breast cancer death per 1,000 women screened.

OBJECTIVE: The goal of this project is to provide a breast cancer screening guide for primary care clinicians who take care of women over the age of 74.

METHODS: We reviewed screening mammography guidelines from the major medical organizations in the United States, Canada, Australia, and the UK, then completed an extensive literature review to find the supporting original research for these recommendations.

RESULTS: The decision to continue breast cancer screening in women over the age of 74 should be reached through a shared-decision making process that takes into account a woman’s overall health, life expectancy, and preferences. Generally, screening may be beneficial for women without severe comorbidities, and a life expectancy of 10 or more years. Mortality indices can be used to corroborate clinical judgement, and health decision aids can be utilized to improve a patients’ understanding of the risks and benefits of breast cancer screening in older women.

CONCLUSION: More online breast cancer screening health decision aids need to be developed for women over the age of 74, to facilitate and enhance the decision-making process.
POSTER 65

Title: Predictive Value of Abnormal Hemodynamic Response to Dobutamine Stress Echocardiography in Liver Transplant Recipients

Name: Ashley Peotter

BACKGROUND: Orthotopic liver transplantation (OLT) is the definitive treatment for end stage liver disease (ESLD). Patients with ESLD have higher incidence of coronary artery disease (CAD) than the general population so screening is essential for proper graft allocation. Dobutamine stress echocardiography (DSE) accurately detects CAD, a risk factor for major adverse cardiac events (MACE), in non-ESLD patients. However, DSE is less sensitive in the ESLD population. In the general population, marked hypotension on DSE is associated with increased MACE rates.

OBJECTIVE: We aim to determine if abnormal hemodynamic response during DSE is associated with MACE in patients undergoing OLT to aid in the decision-making for determining OLT candidacy.

METHODS: Retrospective chart review was conducted on all patients who underwent a DSE prior to OLT at the University of Wisconsin Hospital from 2009-2018. MACE was defined as arrhythmia, myocardial infarction, heart failure, or cardiac arrest from discharge summary diagnosis codes. Abnormal hemodynamic response during DSE was defined as hypotension (decrease in systolic blood pressure [SBP] of ≥20 mmHg, or absolute SBP <80 mmHg), hypertension (SBP ≥180 mmHg), or inability to achieve target heart rate (<85% maximum predicted heart rate [MPHR]). Data was analyzed using multivariate logistic regression.

RESULTS: 395 patients had DSE prior to undergoing OLT. 27.3% of these patients experienced at least one MACE. 52.4% of the patients had an abnormal hemodynamic response to preoperative DSE: 35.3% hypotensive, 8.2% hypertensive, and 56.5% failed to reach 85% MPHR. Neither hypotensive response to DSE (p=0.52), or an inability to obtain 85% MPHR on DSE (p=0.28) were associated with MACE. There was a trend toward significance with a hypertensive response to DSE (p=0.06) in this small population. Additionally, there was a significant correlation between increasing systolic blood pressure and the incidence of MACE (p=0.0098). Each 40mmHg increase in maximum systolic blood pressure was associated with an increase in odds of MACE (OR 1.19 with 95% CI [1.04 to 1.37]).

CONCLUSION: In this study, abnormal hemodynamic response did not increase the predictive value of DSE in the ESLD population as it does in the general population. There was a trend toward significance with a hypertensive response to DSE, but this was limited by a small sample size and known cardiac physiology of patients with ESLD.
POSTER 66

TITLE: Development of novel deuterated small molecules with improved pharmacokinetic (PK) profiles for inhibition of necroptosis.

NAME: Samantha Prince

BACKGROUND: Abdominal aortic aneurysm (AAA) is the progressive expansion of the aorta by more than 50% of the normal diameter and is one of the leading causes of death in the United States. As of yet there are currently no effective therapies available to treat patients with small non symptomatic aneurysms. The Liu Lab has demonstrated a necroptosis pathway involving receptor-interacting protein kinase-3 (RIP3) to be a central mediator to the pathophysiology of AAA. A potent inhibitor to RIP3, C9, has been shown to inhibit formation of AAA, however its specificity and cytotoxicity has not been fully elucidated.

OBJECTIVE: The objective of this pilot project is to translate C9 to a drug candidate by improving its chemical and pharmacological properties.

METHODS: We determined in vivo efficacy of the parent compound C9 on male C57B/6 mice at 8-10 weeks old. They were subjected to aneurysm induction by sequential perivascular application of CaCl2 and Phosphate-Buffered Saline. Mice were randomly divided into 5 groups receiving solvent or C9 at 0.32, 0.93, 2.32, or 4.30/mg/kg/day via IP injection. Daily treatments were given until euthanasia at 14 days. We assessed aneurysm formation by measuring aortic diameters. An increase in external aortic diameter of 100% or higher comparing to pre CaCl2 treatment was defined as aneurysmal.

We determined in vivo efficacy of analogs D3 and D5 using the sub-maximal dosage of 0.93/mg/kg/day. The surgery and drug administration were carried out as described above.

Histology analysis of arterial sections was done to detect degradation of elastin fibers, a pathological characteristic of aneurysm.

RESULTS: We observed in our pharmacokinetic study that D3 had ~60% higher Cmax and AUC compared to C9. Using one mouse model of aortic aneurysm, we demonstrated D3 and D5 retained the in vivo efficacy of the parent compound C9 in attenuating aneurysm formation. Based on the gross anatomy and histology data, D3 appears to be more potent than the parent compound.

CONCLUSIONS: We have successfully improved the chemical and pharmacokinetic properties of the RIP3 inhibitor C9 through deuteration. Based on our success in improving PK profile, we remain optimistic of achieving our long-term goal of developing a RIP3-inhibitor that is safe and effective.
TITLE: Improving UWSMPH Career Advising

NAME: Simarjeet Puri

BACKGROUND: The LCME, as the accrediting body for MD degree programs in the US, has established the importance of mentorship in helping medical students navigate the complexities of becoming doctors. Despite excellent Match outcomes, the AAMC Graduation Questionnaire survey showed a paradoxical decrease in satisfaction among graduating M4 students with career counseling services. Compared to other medical schools, UWSMPH was scored in the lower quartile for student satisfaction in “Career Counseling and Advising” in 2018.

OBJECTIVE: Explore the root causes of student dissatisfaction with career counseling services at UWSMPH.

METHODS: For my project I used the “FOCUS-PDCA” model used widely across UW Health. Learning about the current state involved,

1. Analysis of past surveys
   a. GQ surveys from 2014 to present.
   b. Independent Student Analysis and Fall 2017 MD Student Survey
2. Learning about the Academic Career Advising Program
3. Scoping review
   I selected papers from PubMed pertaining to medical school career advising at North American medical institutions published within the last 15 years. Searching on CINAHL and Scopus produced no unique papers from my PubMed search.
4. Informal interviews with House mentors and medical students
5. M2 focus group
   Dr. Julie Foertsch and two other Shapiro students helped develop the protocol. Independent thematic analysis was then completed by each Shapiro student to come up with a shared list of themes discussed in the focus group.

RESULTS: The root causes I discovered through my project are fit into five broad categories. They are illustrated in the fish bone diagram below.

CONCLUSIONS: Out of my eight recommendations I made addressing each root cause, the following three are the most important:

1. Improving programming for residency preparation and the timing of those events is crucial.
2. Adding a short session on how students can build mentoring relationship while on rotations during the orientation to Phase 2.
3. Implementing a rigorous annual review process will allow growth with each iteration of the program and larger data sets to inform changes made. In this annual review, it is imperative to engage students and gather their feedback, which is not without its challenges. A solution to this would be to include student representatives as part of ACAP. The elected House Representatives are possible candidates for this position.
POSTER 68

TITLE: Changes in the Practices of Interdisciplinary Trauma Teams in Response to Simulation Debriefing

NAME: Yazeed Mamoun Qadadha

BACKGROUND: Simulation education is a significant part of training medical professionals. Many studies have evaluated the efficacy of debriefs on simulation effectiveness and learning outcomes. However, most of these studies start with an established list of practices to be assessed, regardless of the content of the debriefs.

OBJECTIVE: Our study evaluated debriefing’s impact on subsequent simulation performance by using debrief content as the source of practices to be compared and automating the comparison of those practices through analysis of transcripts of trauma simulation sessions.

METHODS: The learner groups for each simulation session consist of 5 trauma trainees participating in 2 simulations mimicking real-life trauma scenarios. These sessions are run by 3 faculty, one each from Trauma Surgery, Emergency Medicine, and Nursing. The sessions begin with a simulation followed by a debriefing session and a second simulation. Faculty score the simulations using the Trauma Nontechnical Skills Assessment (T-NOTECHS). We analyzed the transcripts of 6 pre-post simulation pairs and their corresponding debriefs. We started by viewing the 6 debriefing transcripts and grouped feedback items seen consistently in debriefs to generate themes raised of areas for improvement using conventional content analysis. The list of feedback themes and was further refined based on the ability to create a computer-run code for each item. Using these codes, we assessed the change in practices, by conducting match-pairs t-tests comparing those practices in the simulations pre- and post-debrief. Calculation of the change in practices was done using text analysis. We used regular expressions to automate coding of the transcripts. We used matched-pairs t-tests to compare the T-NOTECHS scores on pre- and post-simulations.

RESULTS: Feedback extraction allowed for the development of 9 automatable behaviors. Verbalizing Reasoning Behind Next Steps, Making Summary Statements, Not Interrupting Others, Using the Leader as a Hub for Information, & Speaking Up with Concerns were not significantly different between the pre- and post-debrief simulations. Verbalizing Findings Loudly and Clearly, Closing the Loop, & Directing the Assessment and Effective Role Assignment improved significantly after the debrief (p = < .05). Use of Directed Communication had a significant decline (p < .05). All components of the T-NOTECHS assessment were significantly higher in the second simulations (p < .05).

CONCLUSION: This study of the impact of debriefs on learners’ performance in trauma simulation emphasizes the feedback discussed in debriefing as the focus for assessing change in practices. Although the T-NOTECHS scores improved, our measures did not reflect that. This could be due to the codes not capturing changes, or perhaps the holistic picture presented by the T-NOTECHS does not align with nuanced shifts in communication that indicate meaningful changes in teams’ behavior.
POSTER 69

Title: Versican as a novel regulator of CD8+ T cell accumulation in human breast adenocarcinoma

Name: Tonela Qyli

Introduction: Despite advances in chemotherapeutic regimens, breast adenocarcinoma remains the second leading cause of cancer-related death in women worldwide. While in the past breast cancer was shown to be largely resistant to immunotherapy, recent studies have shown that some triple negative breast cancers (TNBC) are responsive to immunotherapeutics. However, the defining characteristics of this subset of immune-responsive breast cancers remain elusive. In this study, we aim to demonstrate that versican (VCAN) absence in breast cancer is associated with increased CD8+ T-cell accumulation. Furthermore, we hypothesize that absence of VCAN and CD8+ accumulation is associated with estrogen receptor-negative (HR-) breast cancer. Given the economic burden and potential toxicity of immunotherapy, the identification of VCAN as a new biomarker for predicting cancer immunotherapeutic response is of significant importance for the future of cancer treatment.

Objective: The purpose of this study is to demonstrate that VCAN absence in human breast adenocarcinoma is correlated with increased CD8+ T cell accumulation.

Methods: Breast cancer tissues were collected from 394 patients and immunohistochemically (IHC) stained for VCAN, αDPEAAE (cleaved product of VCAN proteolysis), and CD8 and scored by a pathologist. Tumors were classified as VCAN absent (no VCAN stain present on IHC) or VCAN present (1+ staining on IHC) and αDPEAAE absent or αDPEAAE present. Regarding the CD8+ T cell count, all positively stained CD8+ T-cells within a 40X field were counted for each patient sample.

Results: Our preliminary results show that absence of VCAN is correlated with increased total CD8+ T-cell accumulation and ER- receptor status.

Conclusions: These findings may provide a rationale for the utilization of VCAN staining in combination with patient ER- status to predict response to immunotherapy in breast cancer patients.
Developing novel strategies for prevention service coordination for people who inject drugs in rural Wisconsin communities

Shruti Rajan
Mentor: Ryan Westergaard, MD, PhD, MPH
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Background: The U.S. Department of Health & Human Services identifies opioid use disorder (OUD) as a national epidemic, and the consequences are adverse in rural America. Given that access to medical and prevention services is often limited, the rural community members are left particularly vulnerable to preventable harms of injection opioid abuse. There is evidence that interventions, such as syringe service programs, medication-assisted treatment for substance use, naloxone provision for overdose treatment, and testing for HCV, HIV and sexually transmitted diseases (STD) can be effective in combating injection drug addiction and its consequences. However, there has not been a large call to action on applying the lessons about the injection drug epidemics to sparsely-populated rural areas.

Objective: To use an iterative design process to design a Client-Centered Prevention Home protocol that incorporates prevention case management and mobile health information technology into traditional harm-reduction services delivered at syringe service programs in Wisconsin. The goal in outlining and developing a standardized approach to this information is twofold: first, it will provide a useful toolkit for providers and community organization in their day-today clinical practice; and second, it will provide actionable background for future iterations of the protocol development throughout the ongoing UG3 phase of the study (5UG3DA044826-02).

Methods: An extensive literature search was performed to inform the creation of the preliminary draft of the Client-Centered Prevention Home protocol. The draft was created by the respective authors using information and insights collected from: primary care providers, individuals who inject drugs, and protocols acquired from existing evidence-based harm reduction interventions.

Results: Based on the literature search and database process conducted, a thorough overview of harm reduction services and workflows in the nation were documented and archived into a preliminary database for the Client-Centered Prevention Home protocol. The research is currently organized into eight chief domains: general health accessibility intervention, linkage to hepatitis A and hepatitis B immunization interventions, linkage to hepatitis C care, smoking cessation intervention, addressing self-stigma intervention, overdose prevention, HIV risk reduction intervention, and safe injection intervention.

Conclusions: Our research process suggest that there are eight crucial components of harm reduction service provision that are required to create the next draft of the Client-Centered Prevention Home model protocol. The future feedback cycles will involve ARCW community members and staff to be included as part of the iterative process.
POSTER 71
Title: Physicians’ Experiences with Discriminatory Patients: A Qualitative Study

Name: Alexis Ray

Background: Racial diversity is a necessary part of medicine due to the proven benefits to patients and physicians including physicians of color (POC) being more likely to serve minority and medically underserved populations and filling pivotal mentorship roles for other less experienced POC. Unfortunately, retaining POC in the United States has proven difficult, likely due in part to the well-documented discrimination POC face in the workplace. This discrimination has been described from sources including colleagues and more senior faculty, but patient’s physician-directed discrimination has not been studied in these contexts.

Objective: The objective of this study was to use interviews with physicians to better understand the interactions POC have with discriminatory patients.

Methods: This qualitative study consisted of 26 physicians; 9 male, 17 female, and 12 POC. Participants were from both private and public institutions from all four geographic regions of the United States. Participants were interviewed over the phone in a one-on-one, semi-structured fashion to explore their experiences, perceptions, and observations of biased or discriminatory behavior exhibited by patients toward POC. Transcribed texts from the interviews were examined using inductive thematic analysis to search for segments of meaningful text (codes), facilitated by a software program called QSR NVivo, and codes were organized into themes and subthemes.

Results: We have thus far identified several themes that deepen the understanding of interactions between POC and discriminatory patients. One theme involves the attending/trainee relationship and highlights discrimination towards trainees as being more prevalent. Subthemes under this are the attending’s protection of their trainees and using the encounter as a learning opportunity. Another theme is the attending’s responsibilities when it comes to themselves or a member of their team being the target of discrimination. Subthemes of this include establishing the target of discrimination as an expert and empowering the target of discrimination to choose the response.

Conclusion: There are a wide variety of responses to observed discrimination used by both POC and white physicians, but protecting and empowering trainees was a common goal and finding sources of support is often a way for targets of discrimination to process these events. Though training on this subject is uncommon, physicians are open to taking part in a training if it was offered to them. Such trainings may contribute to a less stressful work environment for POC.
POSTER 72
Predictors of Outcomes for Small for Gestational Age Neonates in the NICU
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Background: Neonates born small for gestational age (SGA), are at-risk for developing many acute NICU complications, as well as chronic developmental issues. SGA is defined as body weight below <10th percentile for gestational age using the Fenton growth curve. Maternal hypertension (Htn), multiple gestation pregnancies, birth defects and congenital infections are all associated with neonatal SGA. Complications associated with SGA have historically included delayed birth transition, lower APGAR scores, respiratory support, poor growth, longer inpatient stays, and higher morbidity and mortality. However, with current at-risk antenatal clinic monitoring practices of growth-restricted fetuses, predictors of postnatal outcomes in SGA neonates are poorly understood.

Objective: To examine pregnancy factors to outcomes in SGA neonates in the NICU.

Methods: A retrospective cohort study of our local NICU Vermont Oxford Network neonatal characteristics and outcome data from 2015 through 2018 was performed. Three groups were studied: AGA using > 10th using Fenton curve; 5th-10th percentile SGA or <5th percentile SGA. Both categorical and continuous data were analyzed. Neonates <30 weeks gestational age were excluded due to best obstetrician practices in delaying SGA births to at least 30 weeks.

Results: Of 2350 NICU admissions, 18.8% were SGA <10th, with 13.5% between the 5-10th and 5.3% <5th percentile. 25% of SGA pregnancies experienced Htn. In both SGA <5% and SGA <10% groups, Htn predicted head circumferences at birth <10th percentile (p<0.005). In the SGA <5th group, Htn also predicted home O2 need (6.67% vs 1.42% in AGA, p<0.035). In survivors, chronic lung disease, infections, and extreme length of stay and mortality did not differ between groups.

Conclusions: In the NICU, being SGA <10th is common, but most are between the 5th-10th percentile and have better outcomes than those <5th percentile. It would be important to recognize and counsel families about difference in outcomes and to study whether antenatal ultrasound monitoring of fetal well-being and optimal timing of delivery impacts outcomes.
POSTER 73
Evaluation of Infection and Antibiotic Resistance in Cystic Fibrosis Patients After Initiation of CFTR Modulators

Aaron Rottier

Background: Cystic Fibrosis (CF) is an autosomal recessive genetic condition where there is a mutation leading to dysfunction of the cystic fibrosis transmembrane conductance regulator (CFTR). CF patients have an increased risk of infection from pathogens.

CFTR modulators have been approved for treatment of patients with specific CFTR mutations. The modulators have shown to improve lung function tests, decrease pulmonary exacerbations, and there is some evidence that specific modulators have activity to clear and reduce bacterial infections.

There has been little investigation assessing rates of bacterial resistance in CF patients on CFTR modulators as compared to CF patients prior to the approval and use of CFTR modulators.

Objectives: The objective of this study is to prospectively assess the CF patients treated with CFTR modulators rates of infections compared to infection rates prior to initiation of CFTR modulation therapy and to assess susceptibility of the infectious pathogens.

Methods: This study is a longitudinal retrospective cohort analysis of patients at UW Health to investigate the impact of CFTR modulators in patients with CF on the risk of acquiring resistant pathogens and their incidence of infections. We will include all CF patients, 12 or more years old, at UW Health. Data will be obtained from January 1, 2011 until January 1, 2018.

We will analyze two cohorts of patients: (cohort i) patients not on modulator therapy either prior to CFTR approval or post approval versus (cohort ii) patients receiving CFTR therapy. Data collection will include a chart review of patient demographics, concomitant medication, and comorbidities. The number of infections and antibiotic susceptibility of identified pathogens will be recorded from the electronic medical record and analyzed using a multivariate model and a chi square test using GraphPad Prism 7.

Results: Data collection has begun, however there are more encounters per patient than anticipated. We do not have sufficient data to begin any primary data analysis.

Conclusions: At this point, we are still in the data collection phase of the study. We do not have sufficient data to make any preliminary conclusions about the data.
POSTER 74

TITLE 7 Tesla Diffusion Tensor Imaging and Quantitative Susceptibility Mapping of Huntington’s Disease

NAME Paul Rowley

BACKGROUND Huntington’s Disease (HD) is an autosomal dominant neurodegenerative disorder caused by aberrant expansion of cytosine-adenine-guanine (CAG) repeats in the HTT gene (4p16.3). With only symptom modifying therapy and no proven markers to evaluate treatment prior to diagnostic motor symptoms, the identification of robust neuroimaging biomarkers throughout all stages of HD remains central to accurately assessing disease severity and predicting progression.

OBJECTIVE High-field 7T MRI was acquired to examine and compare white matter microstructure and quantitative susceptibility in premanifest (PM) and early manifest (EM) Huntington’s disease (HD) patients and age-matched healthy control (HC) subjects.

METHODS A 7T GE research scanner was used to scan n = 27 subjects (6 PM, 7 EM, 14 HC). Diffusion tensor imaging (DTI) involved a diffusion-weighted, single-shot EPI sequence with two-shell 90 direction diffusion acquisition (30 at b=1000s/mm^2, 60 at b=2000s/mm^2) with 2 mm isotropic resolution. Quantitative Susceptibility Mapping (QSM) was acquired via 3D multi-echo gradient recalled sequence with 0.8 mm isotropic resolution. GRAPPA reconstruction was applied to estimate missing k-space information prior to obtaining coil magnitude and phase images. Tissue phase was extracted from the raw phase and used to reconstruct the susceptibility map. Tensor data were reconstructed for creation of and spatial normalization to an isotropic 1 mm resolution study-wide population template. HC tensors were averaged, and the output volume was reformatted for deterministic fiber tracking with fractional anisotropy (FA) threshold 0.2, angular threshold 35°, and step size 1 mm. Seeding regions included caudate, putamen, globus pallidus (GP), striatum, cingulum, corticospinal tract (CST), and uncinate fasciculus (UF). Generated track groups were used to estimate diffusion measurements and susceptibility values for each subject. QSM values were normalized using same-subject ventricular susceptibility data before statistical analysis. Group-wise analyses were considered statistically significant for p-values < 0.05 after correction for multiple comparisons.

RESULTS Bolstering prior studies, FA was significantly greater for all regions among HC and PM compared to EM. Unique to this work, QSM analysis showed significantly greater susceptibility in the CST of HC and PM relative to EM. Additionally, the GP of PM demonstrated significantly higher susceptibility compared to EM.

CONCLUSION 7T MRI detects early neurodegenerative changes in deep gray matter and motor tracts of premanifest HD patients.
Title
Cytotoxicity of Wound Cleansing Agents on an Ex Vivo Human Skin Model
Clayton J Rust

Introduction
Wound infection is a major cause of delayed wound healing or non-healing. To prevent infection, wound cleansing is an important step in the management of wounds. However, the choice of antiseptics in wound cleansing remains controversial due to potential cytotoxicity observed in vitro to epithelial cells. Clinical decision-making must balance cytotoxicity and antiseptic efficacy; therefore, more rigorous studies are needed to provide appropriate treatment recommendations on the choice of antiseptic agents.

Objective
The purpose of this study was to use an ex vivo human skin model to evaluate the cytotoxicity of commonly used wound cleansing agents.

Methods
Human skin samples were obtained from four patients, who underwent elective reconstructive surgeries. Partial thickness excisional wounds were created using a 6mm biopsy punch in the center of 12mm full thickness skin biopsies. After 24 hours of incubation at 37 °C, wound cleansing agents, including 1x phosphate buffered solution (PBS), Dial Soap, Dove Soap, 10% Povidone Iodine and 2% Chlorhexidine (CHG), were applied topically onto the excisional wounds for 30 minutes and then rinsed and incubated for an additional 24 hours. At 24 hours post-treatment, cell viability was quantified using tetrazolium based (MTT) assay and localization of non-viable cells was visualized using lactate dehydrogenase (LDH) stain. Repeated measures ANOVA and post-hoc comparison using Tukey’s correction were performed and level of significance was determined at p <0.05.

Results
As measured by MTT, CHG (71.3%, p<0.001) and Dial (81.6%, p<0.05) treated groups had significantly reduced cell viability compared to PBS; CHG treated group also had decreased cell viability compared to Iodine (93.6%, p<0.001) and Dove (90.8%, p<0.001) treated groups. LDH staining showed that cellular death was clearly demarcated along the wound edge in the epidermis and approximately halfway through the dermis in CHG-treated tissues. Cellular death was also evident in the upper dermis of Dove treated tissue. All other biopsies showed cellular viability throughout the tissue.

Conclusion
CHG had a cytotoxic effect on skin tissue as evidenced by LDH stain and MTT assay compared to other commonly used antiseptics. Future studies will investigate the antiseptic efficacy of the wound cleansing solutions to determine the risk/benefit profile of each antiseptic. Together these data will help guide healthcare providers in the clinical decision-making process.
POSTER 76

TITLE: Characterization of Shared Decision Making for Older Patients Considering Major Surgery: A Mixed Methods Study

NAME: Kathryn Schulz, Anne Buffington, Christopher Zimmermann, Nicholas Marka, Amy Zelenski, Jennifer Tucholka, Anna Kata, Dan Fox, Nathan Baggett, Margaret L. Schwarze

BACKGROUND: Shared decision making is a strategy designed to support informed decision making and to ensure that treatment aligns with patient goals. It is an important tool for older patients considering surgery with high risk of morbidity, mortality, or change in functional status.

OBJECTIVE: To characterize the use of shared decision making for older adults considering major surgery and to describe factors related to inter- and intra-surgeon variability.

METHODS: We performed secondary analysis of decision-making conversations recorded during a randomized clinical trial testing a question prompt list intervention to support patients in conversations with surgeons. The study enrolled 446 patients age 60+ with at least one comorbid condition who met with one of 43 surgeons from 5 sites to discuss major vascular or oncologic surgery. Two coders scored each transcribed recording using OPTION-5 (a validated measure of shared decision making). We then tested the intervention’s effect on surgeons’ OPTION-5 scores. We used descriptive statistics to test the relationship between OPTION-5 score and conversation length, surgeon specialty, and practice location. We then used qualitative content analysis to characterize differences between high- and low-performing surgeons.

RESULTS: 383 patients discussed major surgery. Average surgeon OPTION-5 scores ranged from 11.7 (±5.8) to 64.2 (±19.0) (scale 0-100). The intervention had no effect on individual surgeons’ scores and scores were not associated with conversation length, surgeon specialty, or practice location. Score variability was low among low-performing surgeons and high among high-performing surgeons. Low-performing surgeons rarely offered more than one treatment option, while high-performing surgeons regularly discussed multiple options even when there was one best option. High-performing surgeons achieved higher scores when the value of surgery was uncertain, expected outcomes were poor, or options were inherently preference-dependent due to differences in functional outcome.

CONCLUSIONS: There is significant variability between surgeons in the use of shared decision making with older patients considering major surgery. Inter-surgeon variability in OPTION-5 score is not dependent on conversation length, surgeon specialty, or practice location. High-performing surgeons regularly explore alternative treatments and selectively employ shared decision making based on their assessment of clinical equipoise.
TITLE: Assessment of PCP InBasket Burden Using Direct Observation Time Motion

NAME: Rutvi B. Shah

BACKGROUND: Time on Electronic Health Records (EHR) impacts the quality of life of Primary Care Providers (PCPs). PCPs spend time in direct patient care as well as various non face-to-face activities, including EHR (In-Basket tasks). However, the amount of time PCPs spend on In-Basket activities is not well understood.

OBJECTIVE: Assess time and usage patterns of PCPs managing their In-Baskets during normal clinic hours; compare patterns across Family Medicine (FM) & General Internal Medicine (GIM)

METHODS: Observational time motion study of PCPs using WorkStudy+ App to track time associated with In-Basket management during clinic sessions. PCPs were chosen based on convenience sampling and included 14 PCPs from FM (n=7) and GIM (n=7) clinics affiliated with UW Health. Participants had been in practice several years and were known to have different EHR proficiencies associated with In-Basket task management. Each PCP was observed for a single half-day clinic session. The time spent on each In-Basket task category associated with ambulatory primary care was measured.

RESULTS: On average, these PCPs spent 40% of their in-clinic time interacting with the EHR. Of the time spent in the EHR, nearly 40% was spent on In-Basket management. The average time associated with the most common In-Basket tasks included 62 seconds per Patient Portal Message, 50 seconds per Patient Telephone Encounter, 36 seconds per Result Management, and 36 seconds per Prescription Refill. These results underestimate the time spent with specific In-Basket tasks since the observer was not able to capture in real time all steps associated with completion of each In-Basket task.

CONCLUSIONS: PCPs spend substantial in-clinic time completing non face-to-face tasks in the In-Basket. The In-Basket activities that take up the most PCP time per task include responding to patient portal messages and telephone calls. Since there is a link between physician well-being and In-Basket volume, workflow redesign is needed to reduce the PCP burden of In-Basket tasks. Further study is needed to assess the concordance between the direct observations and EHR audit log data.
TITLE: Assessing the Role of ATG9A/FAM134B Interactions in Aging-Associated Reticulophagy

NAME: Samantha L. Shapiro

BACKGROUND: With the increasing average human lifespan, aging-associated problems have become a particularly prevalent and costly issue in society. Studying the biochemical and mechanistic underpinnings of aging-related conditions is crucially important, as a better understanding of the disease process will allow scientists to design interventions that can be used to lower healthcare costs through direct patient care. In researching the link between biological aging and disease phenotypes, the laboratory of Dr. Luigi Puglielli has focused its attention on the topic of autophagy – a process by which cells dispose of large protein aggregates within the secretory pathway and the cytosol. Dysfunctional autophagy has been implicated in aging, and the Puglielli Lab has identified an ER-specific autophagy (i.e., “reticulophagy”) pathway that has direct connections to aging-related phenotypes. To gain further insight into this pathway, my Shapiro Project focused on generating various DNA plasmids of two proteins – ATG9A and FAM134B – that have been previously identified as playing a role in the reticulophagy pathway.

OBJECTIVE: The goal of this project was to assess how specific structural features impact the interaction between FAM134B and ATG9A. By generating ATG9A plasmids with various structural modifications, we expect to observe altered ATG9A/FAM134B interaction, as measured through co-immunoprecipitation and protein quantification.

METHODS: Desired ATG9A DNA plasmid sequences were designed and created using Invitrogen QuikChange® Mutagenesis kits. Once desired plasmid sequences were confirmed, individual mutagenized ATG9A plasmids were co-transfected into HEK293 cells along with a wild-type FAM134B plasmid. The ATG9A and FAM134B plasmids both contained specific “tags” that were used in subsequent co-immunoprecipitation/Western blot assays to investigate how the proteins interacted in vitro.

RESULTS: Using the plasmids that were generated, I determined that deleting the C-terminal of ATG9A leads to increased protein/protein interaction between ATG9A and FAM134B.

CONCLUSIONS: Research into the interactions between various segments of ATG9A and FAM134B is ongoing. However, the finding that deleting the C-terminal of ATG9A leads to increased interaction between ATG9A and FAM134B is consistent with evidence that another protein – Heat Shock Protein – may be involved in binding to the ATG9A C-terminal and inhibiting ATG9A/FAM134B interaction in this domain.
POSTER 79
TITLE: Assessing emergency care needs of an indigenous community in rural Guatemala

NAME: Amber Sheth

BACKGROUND: Access to emergent care represents an essential facet of any country’s public health system, but is consistently identified as especially important in low and middle income countries. A quantitative evaluation to describe the illness burden and capacity of local facilities as well as a qualitative evaluation of the need and barriers to care are needed. San Lucas Tolimán is a small town in rural Guatemala. The population is mostly indigenous Mayan with at least half the population spread out in small villages surrounding the town.

OBJECTIVE: To assess current acute care use and determine barriers to accessing acute care in the community.

METHODS: Using a community based participatory research method, we conducted a qualitative study consisting of focus group interviews, which consisted of community members, health promoters, and medical providers. We conducted 11 focus groups in 6 communities with 47 participants. Focus group data were analyzed using grounded theory methodology. A retrospective chart review of the San Lucas Tolimán emergency department from the year 2018 was also completed. Patient vital signs and chief complaint were analyzed with the South African Triage Scale to assess acuity, while final disposition and referrals were assessed to understand the limits of this particular ED.

RESULTS: Conditions that participants perceived as emergent or emergency conditions that people had experienced were relatively consistent between communities. Transportation and lack of economic resources were regularly cited as barriers to seeking timely emergency care. Health workers referenced low patient health literacy as a cause for needing more emergency care than would be necessary if preventative measures were taken and for misutilization of the ED. Community members and ED providers suggested several initiatives to overcome some of the barriers to care including improving self-advocacy and access to the ED. Chart review results are expected to demonstrate that many patients are diagnosed with and treated for conditions which have clear roots in the social determinants of health, such as access to clean water and safe work conditions.

CONCLUSIONS: Participants determined many barriers to emergent care in the communities surrounding San Lucas Tolimán, Guatemala. The results of this study lay the groundwork for implementing community-identified initiatives to improve access to and awareness of acute medical care for this rural indigenous population.
POSTER 80
Project Title: O-mannosylation of C. auris and its Role in Neutrophilic Evasion
Student Name: Emily Rae Sheveland
Mentor Name and Title: Jeniel Nett, MD, PhD
Institution and Department: University of Wisconsin Infectious Disease

Research Plan

1. Background and significance

Candida auris, an emerging invasive fungal species, has reached a mortality rate of about 60%\(^1\). C. auris was compared to the common pathogen Candida albicans\(^1\). When observing the neutrophilic interactions with both fungi, it was clear that C. auris did not elicit the same neutrophil response\(^1\).

Studies have shown that few neutrophils can engage or phagocytose C. auris (15%) when compared to C. albicans (50%)\(^1\). This result leads us to theorize that there is something on the surface of C. auris that prevents neutrophil recognition or engagement\(^1\). The cell wall of fungi is composed of polysaccharide; chitin, glucans, and mannans that influence pathogenesis\(^2\). Work in the lab laboratory revealed that hydrolysis of α-mannans on the C. auris cell surface led to increased phagocytosis by neutrophils\(^1\). Of interest are O-linked mannans which have α-mannan connected to the hydroxyl group of a serine or threonine residue\(^2\). To examine O-mannosylation in C. auris, we will construct mutants of the homologous PMT genes in C. auris.

2. Hypothesis or Research Question

I hypothesize that the removal of O-mannosylation on the cell wall of C. auris will increase neutrophils phagocytosis and killing C. auris.

3. Research Design and Methods

The first step will be to construct the C. auris mutants. Cassette construction started with creating flanks that corresponded to areas upstream and downstream of the PMT5 gene. These flanks were then added to a gene that coded for nourseothricin resistance gene (NAT1) gene via PCR. This full cassette used the 5’ and 3’ complementary direct correct integration during electroporation. The NAT1 gene will then be integrated into the genome to replace the gene of interest and act as a selection marker. The transformation was completed by electroporation to induce uptake of the cassette into the nucleus of the yeast. The yeasts were then streaked on a nourseothricin-containing plate to select colonies that were successfully transformed. PCR with primers to check for correct integration of the 5’ and 3’ was completed before sending DNA for sequencing.

4. Results

The DNA that was sent out for sequencing indicated that there was a duplication of the targeted PMT gene.

5. Discussion

The difficulty to successfully create a C. auris mutant hindered our ability to look further into the role of O-mannosylation on the immune system’s ability to control C. auris infections. The CRISPR system is one potential option for generating mutants in the future.
Sources:

project title: mortality after non-operative vs. operative treatment of geriatric hip fractures

name: edward shin

background

Currently operative management remains the standard of care for geriatric hip fracture patients. Nevertheless, nearly 2.6-10.6% of geriatric hip fracture patients choose to pursue non-operative management of their hip fractures. Unfortunately, there remains inconsistent reporting of the expected outcomes and mortality rates following non-operative treatment of hip fractures, with published mortality rates ranging from 18-64% within the first year after injury.

objective:

The purpose of this study is to identify the mortality rate and overall satisfaction level of a cohort of non-operatively treated geriatric hip fracture patients. We also plan to compare these outcomes with a matched cohort of hip fracture patients who underwent operative treatment. We hypothesize that the non-operative hip fracture patients will have a higher 1-year mortality rate and lower patient satisfaction when compared to patients treated operatively.

methods:

We conducted a retrospective review, using the electronic medical record, of patients who suffered hip fractures and were treated both operatively and non-operatively at a single tertiary-care center over a nine-year period from January 1, 2009 to December 2018. Patients were identified by ICD-9 codes for hip fractures. A 2:1 matched pairing algorithm was applied (2 operative patients for each non-operative patient) using the American Society of Anesthesiologists (ASA) and Charlson Comorbidity Index (CCI) scores. The primary outcome was one-year mortality.

Both operative and non-operative patients were contacted via telephone. A series of questions was then asked in regard to the patient’s overall satisfaction level in terms of treatment outcome. If the patient was deceased, family members were given the option to answer the satisfaction questions.

results:

From our initial results, the non-operative patients had a higher mortality rate with the average length of survival being less than 1 year. This is in stark contrast to the operative patients which had an average mortality rate of at least 3 years. Interestingly, the non-operative patients reported a much higher level of satisfaction when compared to the operative cohorts.

conclusion:

Our findings provide helpful counseling information for patients and their family members with regards to outcomes and mortality rates following non-operative management of hip fractures. Our data also suggests that while operative management confers a benefit in terms of mortality, patients who choose non-operative treatment report high levels of satisfaction. Consideration must be given to a patient’s comorbid conditions when determining the most appropriate treatment option for each patient.
POSTER 82

Title: Regional blocks with liposomal bupivacaine for patients undergoing major colorectal surgery

Name: Paul Skelton

Introduction: Excess opioid prescribing by surgeons contributes to the ongoing opioid epidemic and leads to postoperative complications and prolonged length of stay. Regional blocks, such as the transabdominal plane (TAP) block help manage postoperative pain and decrease opioid use. Liposomal bupivacaine (LB) was recently approved for use in TAP blocks and provides longer-acting pain control relative to traditional bupivacaine TAP blocks. The objective of our study was to compare LB TAP blocks with other commonly used means of regional analgesia to determine their effect on opioid use after colorectal surgery.

Methods: We conducted a retrospective analysis of patients who underwent major inpatient colorectal surgery from 3/2018 to 5/2019 at a tertiary care center. Patients were analyzed in 4 groups based on the type of perioperative analgesia they received (LB TAP block, bupivacaine TAP block, epidural, or no regional anesthesia). Our primary outcome was inpatient opioid use normalized to milligram morphine equivalents (MME). Secondary outcomes included ileus, uncontrolled pain (pain score 9-10), and MMEs prescribed at discharge. Results were analyzed with ANOVA and Pearson chi-squared tests for primary and secondary outcomes.

Results: A total of 613 patients underwent major inpatient colorectal surgery in the study period. Our cohort included 97 (15.8%) patients who received LB TAP blocks, 149 (24.3%) who received bupivacaine TAP blocks, 125 (20.3%) who received epidural analgesia and 242 (39.5%) patients who received no regional anesthesia. On bivariate analysis, there were no significant differences between groups for opioid usage at <24 hours and 24-48 hours. All groups had low rates of uncontrolled pain at <24 hours and 24-48 hours (1.9%-11.4%). Patients receiving LB TAP blocks were the least likely to receive a narcotic prescription at discharge compared to patients receiving traditional TAP blocks or epidural analgesia (50.2% vs 61.1% and 72.8%, respectively). Of patients receiving a prescription at discharge, patients receiving LB TAP blocks had the lowest amount of opioid prescribed (150.7±105.5 MME vs 185.3±112.9 and 211.0±164.8). All groups had similar rates of post-operative complications, including ileus.

Conclusion: These results reflect the first 6 months of a quality improvement project aimed at decreasing use of opioids in surgical patients. We found that most patients in our cohort had adequate pain control on postoperative days 1 and 2 and similar inpatient usage of opioids. However, at discharge, patients in the LB TAP group were less likely to receive an opioid prescription and were prescribed less opioids overall. These results will be used to shape future interventions aimed at decreasing postoperative opioid use.
POSTER 83

TITLE: Modeling Grey Matter Changes during Typical Childhood Development

NAME: Marc Skiles

BACKGROUND: It is important with pediatric data to understand the normal developmental trajectory for comparison when looking for specific population differences. The statistical method of mixed linear modeling incorporates between subject differences and may be more appropriate for characterizing grey matter development.

OBJECTIVES: The current study seeks to identify the normative volumetric change in gray matter across childhood development. We anticipate that the combined metric of age and pubertal status will demonstrate superior fit in predicting change in brain matter among typically developing youth.

METHODS: Data for the study was derived from the National Institutes of Health MRI Study of Normal Brain Development (NIHPD). Analyzing 637 scans from 330 participating youth who ranged in age from 4 to 18 years old, multilevel models were constructed using the R-package lme4. Three different models were tested and then compared separately for male and female participants.

RESULTS: For male subjects, the combined model was effective for predicting grey matter decline in males. Participants showed a decrease in volume for each year of participation in the study, and an increase in volume for each pubertal stage reached. The interaction of these two indicated that for each pubertal stage reached, the rate of decline in grey matter was attenuated.

For female subjects, when age at first scan was added to the model, each year of a participant’s chronological age at study entry predicted less grey matter volume at initial scan and increased the rate of decline. Similarly, a model for fixed linear effects of pubertal development indicated that on average grey matter decreased with changes in pubertal status. A more advanced pubertal status at study entry then predicted on average a decrease in grey matter volume at first scan and an increased rate of decline in grey matter at subsequent scans. In the combined model the interaction of these two predictors was not significant.

CONCLUSIONS: For females, a model which uses age or pubertal development is useful in predicting an overall decline in grey matter volume as the child ages. For males, the decline in grey matter predicted by age appears to be attenuated by pubertal development.

As such when comparing grey matter decline in a study group to normally developing male controls in a pediatric population, a model which combines age and pubertal status may be most appropriate to accurately account for between subject differences in a sample.
TITLE: Gastrointestinal Cancer Surveillance: Do Patients Really Want Telemedicine to Replace Our Visits?

NAME: Dave Smith

Introduction: Surveillance following gastrointestinal (GI) cancer treatment can be fiscally and emotionally burdensome for patients, and emerging technology platforms may provide a more resource-wise surveillance strategy. However, effective implementation of GI cancer surveillance is limited by a lack of patient level perspective regarding surveillance; this study aimed to describe what aspects of surveillance care patients value most and identify barriers to optimal care.

Methods: Focused interviews were conducted with 15 GI cancer patients undergoing surveillance following curative-intent surgery. All interviews were audio recorded, transcribed verbatim, and uploaded to NVivo. Study personnel trained in qualitative methods consensused coded 10% of data inductively and iteratively developed a codebook and code descriptions. Using all transcripts, data matrices were developed to identify themes inherent in the transcripts.

Results: Qualitative analysis revealed three overarching themes. First, increasing ease of access to surveillance care through telemedicine follow-up services may interfere with patients’ preferred follow-up routine. Second, specialist providers were trusted by patients to deliver surveillance care more than primary care providers (PCPs). Third, patients desire greater psychosocial health support availability during the surveillance period.

Conclusion: These novel patient-level qualitative data demonstrate that utilizing telemedicine for GI cancer surveillance, and potentially replacing specialist follow up with PCPs, is not what many patients desire. Future efforts to enhance surveillance should include increased psychosocial support and perhaps targeting specific populations who may be interested in fewer in-office surveillance visits.
POSTER 85

TITLE: Quantifying climate-related epidemiology of diarrheal disease in Cape Town, South Africa

NAME: Nicholas Spoerk, Laurel Legenza, Renier Coetzee, James Conway

BACKGROUND: From 2015-2017, Cape Town (CT) experienced consecutive wet seasons with insufficient rain to refill the city’s water reservoirs, leading to municipal water restrictions. Independently, CT experiences seasonal spikes of diarrheal disease, with greatest incidence occurring during the dry summer months.

OBJECTIVE: Our study seeks to quantify changes in the epidemiology of diarrheal disease as they relate to water availability during CT’s recent drought.

METHODS: This study employs a mixed-methods approach. To approximate diarrhea incidence, catalogues from a CT hospital’s central pharmacy were reviewed, and the number of loperamide doses tabulated for each month from July 2013 to June 2019. Separately, a record review was conducted of patients admitted with diarrhea, determined by in-hospital loperamide administration. Information collected included demographic data, clinical course, and length of hospitalization. The above data were compared to concurrent levels of water restrictions.

RESULTS: Incidence of diarrheal disease, using loperamide dispensation as a proxy measure, increased with the onset of the drought. Annual loperamide usage increased 67.9% in the first year of the drought when compared to the preceding 2 years (16472 v. 9811 doses, p<0.001). An independent initiative to reduce loperamide use began in 2016, precluding meaningful comparisons for subsequent years. Length of hospital stay varied in a manner inversely proportional to water restrictions. Average length of stay in pre-drought months was 13.2 days (no imposed water restrictions), compared to 3.06 days in the third year of the drought (87-50 L/person/day), or 6.8 days after the drought (105 L/person/day). Due to low numbers of records reviewed, these data do not reach statistical significance (n=30, p>0.05 for all comparisons).

CONCLUSIONS: Our data suggests that incidence of diarrhea in CT likely increased with progressive water restrictions, while the average length of hospital stay decreased. Taken together, these findings suggest that epidemiologic changes in diarrheal disease during CT’s drought may be largely driven by an increase in moderate-severity cases, with a less appreciable increase in high-severity ones. However, the current state of our data is not sufficient to bear these conclusions to a rigorous level of statistical significance. Further work is needed at comparable sites to make these findings significant and generalizable to the greater CT metropole.
POSTER 86
TITLE: Serum Albumin Levels Prior To Kidney Transplant Predicts Post-Transplant BK and Cytomegalovirus Infections

AUTHORS: Aniruddha Srivastava; Joshua Bodnar; Fauzia Osman; Brad C. Astor; Didier Mandelbrot; Sandesh Parajuli

INSTITUTION: University of Wisconsin School of Medicine and Public Health

BACKGROUND: Post-transplant Infections are a common cause of morbidity and mortality in kidney transplant recipients (KTRs). Prior studies have shown that pre- and post-transplant hypoalbuminemia are associated with graft failure and all-cause mortality. Others suggested that low post-transplant albumin is linked to cytomegalovirus (CMV) infections. These studies suggest serum albumin levels could indicate post-transplant infection risks and graft outcomes.

OBJECTIVE: This study was constructed to explore the relationship between pre-transplant hypoalbuminemia and post-transplant CMV and BK Polyoma virus (BKV)

METHODS: We used our university database to identify adult KTRs transplanted between 01/01/2005 and 12/31/2015. All subjects had serum albumin measured within 45 days before transplantation. We categorized all KTRs into three pre-transplant albumin levels: Group 1: normal serum albumin ≥ 4.0 g/dL, Group 2: moderate hypoalbuminemia 2.5-3.9 g/dL, and Group 3: severe hypoalbuminemia < 2.5 g/dL. We used incidence models per 100 person-years and Cox proportional hazards to compare outcomes between groups.

RESULTS: 1717 patients were included in the study. Of those, 72.3% (n=1241) were identified as group 1, 26.3% (n=451) as group 2, and 1.5% (n=25) as group 3. Patients with moderate hypoalbuminemia were approximately 4 years older than those with normal or severe hypoalbuminemia. While groups differed by cause of ESRD (p=0.001), they did not differ in other baseline characteristics. Incidence of BK viremia for group 1 was 2.8 per 100 person-year which was lower, compared with group 2: 6.0/100 person-year and group 3: 9.9/100 person-year; as well as for CMV viremia, group 1: 2.2/100 person-year, group 2: 2.51/100 person-year and group 3: 3.63/100 person-year. The adjusted relative hazard for BK was also higher for group 2 (HR=1.33, 95% CI[1.0 -1.7]) and group 3 (HR=2.3, 95% CI[1.0-4.9]) compared to group 1 (p-trend<0.001). A similar trend was found for CMV group 3 (HR=1.2, 95% CI (0.39-3.9)) when compared to group 1 (p-trend=0.001).

CONCLUSION: Our results suggest that the degree of hypoalbuminemia pre-transplant is directly correlated with the risk of BKV and CMV post-transplant. Proper screening and management of hypoalbuminemia may be helpful in reducing the future risk of these infections.
Title: HER2 Expression in Endometrial Clear Cell Carcinoma

Name: Bradly Stelter

Background: Endometrial clear cell carcinoma (CC) can be a difficult diagnosis to make using morphology alone. Adjunct immunohistochemical markers are available, namely HNF1α, racemase, and napsin-A, but these so-called CC markers have limited utility, and CC can also have markers regarded as characteristic of serous (SC) or endometrioid (EmC) carcinoma, such as p53 and ER, respectively. Such overlap suggests that at least some CC cases may be better regarded as either EmC or SC. A diagnosis of CC in such cases has the potential to exclude patients from targeted regimens or clinical trials that may be of therapeutic benefit, such as HER2-targeted therapy, which has been approved for SC but not for CC.

Objective: Here we present an assessment of CC markers and HER2 expression in endometrial cancers.

Methods: A tissue microarray of endometrial cancers was stained for p53, HNF1α, racemase, napsin-A and HER2. Representation of all relevant stains was achieved for 26 CC, 78 SC, and 136 EmC. HNF1α, racemase, and napsin-A were scored as positive if appropriately localized staining was present in at least 1% of tumor cells; p53 was scored as mutant/null vs. wild type, and HER2 was scored according to 2007 breast guidelines. HER2 expression was assessed according to clinical diagnosis and expression of HNF1α and p53 and tested by Chi-square analysis.

Results: Expression of CC markers in CC, SC and EmC cases was: HNF1α - 96%/65%/27%, racemase - 23%/19%/12%, and napsin-A - 46%/22%/3%, respectively. HER2 was 3+ in 7/78 SC (9%) and in 5/26 CC (19%) but in 0/133 EmC (0%) (p<0.001). Among HER2 3+ cases, 11/12 (92%) were p53 mutant/null and 7/12 (58%) were HNF1α+. HER2 expression showed no statistical difference between CC and SC (p=0.37) or according to HNF1α expression (p=0.41).

Conclusion: CC shows significant overlap of both classic CC markers and HER2 expression, particularly with SC, pointing to biological similarity between them. Moreover, HER2 3+ cases largely demonstrated aberrant p53 and therefore closely resembled SC. Given additional study, the use of HER2-targeted therapy in CC patients with HER2+ disease may show therapeutic benefit. Additional study is necessary to determine to what extent CC may represent a combination of SC and EmC variants.
POSTER 88

TITLE: Results of engineering, primary care, oncology collaborative regarding a survey of primary care on a re-engineered survivorship care plan.

NAME: Taylor P Stewart

BACKGROUND: Survivorship care plans (SCPs) are recommended for facilitating individualized cancer survivorship care that might be shared between oncology and primary care clinicians. However, limited research has addressed information or workflow needs for primary care clinicians with regards to SCPs. The research team used a systems engineering approach to re-design an SCP informed by primary care preferences.

OBJECTIVE: The study’s objective was to assess primary care clinicians’ perceived usefulness with this re-engineered SCP.

METHODS: A survey of primary care clinicians was used to assess perceived usefulness with the re-engineered SCP. Clinicians were recruited across the U.S. from three primary care practice-based research networks with high rural affiliations.

RESULTS: Over 90% of respondents agreed or strongly agreed that (1) the re-engineered SCP was useful and (2) they would want to receive a similar SCP. The majority of respondents demonstrated high agreement regarding the SCP’s relevance, understandability, content, and ability to help provide better survivorship care. Further suggested SCP improvements involved decreased length, addition of a bulleted list, and integration with electronic health records.

CONCLUSION: Results indicate the majority of primary care clinicians perceive the re-engineered SCP as useful. Utilizing collaboration to mitigate communication issues from shared care between oncologists and primary care may improve survivorship care delivery, including for vulnerable groups such as rural survivors. However, primary care clinicians indicated continued barriers despite end-user specific alterations. Future research should investigate additional strategies to support primary care survivorship- related workload while delivering essential SCP content, and improve survivorship care delivery.
TITLE: Completion thyroidectomy for papillary thyroid cancer: Are two operations better than one?
NAME: Elizabeth M. Stoeckl

BACKGROUND: Thyroid cancer diagnoses are often discovered after diagnostic thyroid lobectomy. Completion thyroidectomy (CT) may be indicated based on tumor features and to facilitate surveillance and/or adjuvant treatment. The adequacy of thyroid resection and the safety of CT compared to total thyroidectomy (TT) are unclear.

OBJECTIVE: We assessed quality metrics such as postoperative unstimulated thyroglobulin (Tg) and PTH to determine adequacy of resection and risk of transient hypoparathyroidism.

METHODS: Patients undergoing TT or CT between 2000 to 2018 by high volume endocrine surgeons at a single academic center were retrospectively reviewed. Pathology, postoperative PTH, as well as 6-week TSH and unstimulated Tg levels of patients were examined and compared. Parametric and nonparametric statistical analyses were performed as indicated.

RESULTS: 2574 patients underwent TT and 257 underwent CT. PTC was identified in 716 (27.8%) patients undergoing TT and 51 (19.8%) patients undergoing CT. Of those with PTC, median postoperative TSH and unstimulated Tg were not significantly different between TT and CT. TSH was 0.92 (IQR 0.09-9.0) mIU/mL after TT versus 0.45 (IQR 0.09-3.1) mIU/mL after CT, p=0.13. Tg was 0.5 ng/mL (IQR 0.1-2.4) after TT versus 0.2 ng/mL (IQR 0.1-0.58) after CT, p=0.50. There was no change in median postoperative unstimulated Tg levels between TT and CT when patients with Tg antibody greater than 4.0 mIU/mL were excluded (28% for TT and 20% for CT were excluded); 0.5 (IQR 0.1-2.5) versus 0.2 (IQR 0.1-0.6) ng/mL, p=0.98.

Mean immediate postoperative PTH and 2-week postoperative PTH were significantly higher in patients undergoing CT compared to TT (immediate postoperative PTH 48 vs. 31 pg/mL, p = 0.0005; 2-week PTH 53±9.5 vs. 37±1.2 pg/mL, p = 0.002). Mean 2-week postoperative serum calcium was no different between CT and TT, 9.1 versus 9.2 mg/dL, p=0.41. Immediate postoperative PTH level < 10 pg/mL occurred in 12% (n=88) of TT patients after surgery, but in only 2% (n=1) of CT patients (p = 0.012).

CONCLUSIONS: If a completion thyroidectomy is required for thyroid cancer, an adequate resection, as assessed by postoperative Tg, can be achieved when performed by high volume endocrine surgeons. Furthermore, CT is significantly less likely to result in transient hypoparathyroidism.
TITLE: 3D-Printed Paranasal Sinuses as a Model for Studying Medication and Irrigation Delivery

NAME: Ari Stone

BACKGROUND: Large-volume nasal saline irrigations are frequently used in sinonasal disease. However, despite the abundance of irrigation systems available on the market, little data exists comparing their anatomic delivery of irrigant.

OBJECTIVE: The purpose of this study was to determine the feasibility of using a novel three-dimensional (3D) printed model to assess irrigation delivery to the paranasal sinuses.

METHODS: A 3D model of a complete paranasal sinus system was created from a deidentified normal patient CT scan using Meshmixer, 3D Slicer, and Cura software. It was then printed using semitransparent polylactic acid and polyvinyl alcohol as a dissolving agent. The model was used to compare the ability of several irrigation devices to reach each of the paranasal sinuses with dyed normal saline. Each delivery was recorded and reviewed at different angles by a three-person panel.

RESULTS: A realistic 3D model of the nasal cavity and paranasal sinuses was successfully printed, with clear visualization of its internal components and partitions. Saline was shown to be delivered to multiple paranasal sinuses. However, depending on the device, not all sinuses were reached equally. In addition, delivery also varied based on head position, regardless of device.

CONCLUSIONS: This represents one of the first semitransparent 3D-printed models of the nasal cavities and paranasal sinuses to be described as a tool for understanding medication and irrigation delivery. This study shows that this is a promising model in assessing the true distribution of irrigation. This also offers many advantages over cadaver models, including: relative affordability, supply, and infinite customization.
Implementing a Health Education Program to Increase Knowledge of Chronic Disease Management in Cataract Patients in Imo State, Nigeria - a pilot study

Authors: Michelle Su1, Adaure Nwaba2, Qianqian Zhao3, Kelechi Mezu-Nnabue4, Udo Ubani,5 E. Uchenna Ikonne,5 Olachi Mezu-Ndubuisi1,6

1Department of Pediatrics, University of Wisconsin, Madison, WI; 2University of Michigan Ann Arbor, MI; 3Department of Biostatistics and Medical Informatics 4Mezu International Foundation, Pikesville, MD; 5Department of Optometry, Abia State University, Uturu, Nigeria; 6Department of Ophthalmology, University of Wisconsin, Madison, WI.

Background: Cataracts are the leading cause of blindness in resource-limited countries. A community outreach study in rural Southeast Nigeria showed that poor health knowledge, finances, and access to vision care services were main factors in the high prevalence of cataracts. 90% of patients were ineligible for a subsequent free cataract surgeries due to poorly controlled hypertension, diabetes, anemia, or glaucoma. An Electronic E-learning program was proposed to improve cataract surgery eligibility.

Objective: This study aimed to develop and test the educational content for a chronic disease management program for cataract patients.

Methods: Following Institutional Review Board approval, socio-economic status (SES), diet diversity, and past medical history were determined in 47 cataract patients aged 35 to 84 years, followed by medical testing for hypertension, diabetes, anemia and glaucoma. Patients were tested on knowledge of chronic medical conditions, listened to the health education program, and then repeated the test. Findings: 40% of patients were male (n=19) and 60% were female (n=28). Only 38% had prior knowledge of their cataracts. 85% had middle, and 15% had high (n=7) SES scores. SES scores correlated positively with diet diversity (r=0.4, P=0.02). Patients' diets were high in carbs (58±22%) and low in protein (15±16%). 35% in middle and 14% in high SES had low diet diversity. 65% in middle and 86% in high SES had moderate diet diversity. None had high diet diversity. Of 13% with diabetes, 83% reported a past medical history. None of the 49% with confirmed anemia reported it. Of 58% with glaucoma, only 30% reported it. Of 72% with hypertension, 62% reported it. Post-education scores were higher than pre-education test scores (69±20% vs 42±25%, P<0.0001). Increases in pre-/post-test scores were not associated with educational level (P=0.26), SES (P=0.27), or visual E-Learning readiness (P=0.8).

Conclusions: Hypertension and glaucoma were more prevalent than diabetes and anemia in cataract patients. Lower diet diversity was seen in low SES, likely from decreased access to diet options. Prior disease awareness was highest for hypertension and poorest for anemia. This education program led to improved knowledge and test scores, regardless of SES or visual impairment. Sustained education on chronic disease management may improve knowledge and compliance, empowering indigenes to better health practices and increase cataract surgery eligibility.
**Background:** Smoking during pregnancy remains a significant public health concern with widespread social, economic, and health effects. There is no safe threshold for smoking and cessation should be encouraged before a woman becomes pregnant.

**Objective:** Maternal smoking in Wisconsin varies over time and by county, age, race/ethnicity, education, and other characteristics. This descriptive epidemiologic information about women who smoke during pregnancy can be utilized to provide targeted clinical and public health interventions.

**Methods:** Smoking during pregnancy in Wisconsin from 2011-2016 was evaluated using Wisconsin Interactive Statistics on Health (WISH) data, which collects information from birth certificates.

**Results:** Maternal smoking rates have declined from 14.4% in 2011 to 11.4% in 2016. Compared with whites, American Indians were 2.8-times more likely to smoke during pregnancy (38.6% vs 13.8%), and 7.0 times more likely to smoke among women with a bachelor’s degree or more (11.2% vs 1.6%). Women aged 20-24 are the most likely to smoke and experienced a relative decline of 29% from 2011 (23.5%) to 2016 (16.6%), similar to the decrease seen in other young women. Compared with those with a doctorate/professional degree, women with some high school but no diploma are 73-times more likely to smoke (29.3% vs 0.4%), and 83 times more likely to smoke among women age 25 or older (33.2% vs 0.4%). Wide variations exist by county, from a low of 6.2% in Waukesha to 33.9% in Forest. Milwaukee County has the 12th lowest rank with 11.3% of mothers smoking during pregnancy.

**Conclusion:** Significant health disparities exist, particularly for American Indians, young women, and the less educated. Culturally appropriate initiatives aimed at American Indians are needed as higher rates persist even when controlling for education. Reducing maternal smoking will require cooperation between clinicians and public health officials. Communities can compare their county rates to others to determine if additional resources are needed for their residents. Providers should encourage cessation throughout the pregnancy, support evidence-based community programs, and be cognizant of the electronic cigarette epidemic taking place among younger women.
POSTER 93

Title: Discovery of new proteoform biomarkers for diagnosis of acute myocardial infarction with high accuracy

Name: William Swain

BACKGROUND: Acute Myocardial Infarction (AMI) is characterized by myocardial necrosis in response to ischemia, causing the release of cardiac enzymes (e.g., CK-MB) and cardiomyocyte contents (e.g., troponin I,T, myoglobin) into circulation. Current immunoassays for various cardiac biomarkers are sensitive but may yield inconsistent results due to batch to batch variabilities in antibodies and heterophilic antibody detection. Moreover, these immunoassays cannot directly quantify the abundance of different proteoforms (e.g., phosphorylated, degraded, etc.) that are present. In contrast, top-down mass spectrometry (MS) provides a “bird's eye” view of all proteoforms and is the most powerful method for intact protein analysis. Intact proteins are the direct enactors of biological function, and dysregulation of protein post-translational modifications are implicated in a variety of human diseases, including cardiovascular diseases. This project is a controlled pilot study where we will analyze the blood of AMI patients by ultra-high-resolution top-down MS to discover new proteoform biomarkers for AMI.

OBJECTIVES: Top-down MS-based identification and analysis of serum proteins will yield protein proteoform changes that correlate with disease-related phenotypes and provide potential proteoform biomarkers for AMI when compared to healthy control samples.

METHODS: We will obtain leftover clinical blood samples from n=30 AMI patients presenting to UW Hospital with ST elevations identified on ECG. We will use front-end protein separation strategies such as reversed phase liquid chromatography coupled with top-down MS analysis to analyze serum proteins, and their relative proteoform abundances. This data will be compared to clinical data (such as cardiac comorbidities and demographic information) taken from HealthLink, retrospectively. We will also collect blood samples and health information from n=10 healthy control subjects.

RESULTS: At the time of authorship of this abstract, no data has been collected.

CONCLUSIONS: This pilot study will guide technical development of our MS-based assay, and inform future exploratory studies involving large human cohorts. If statistically significant correlations between specific proteoforms and clinical data are found with respect to AMI, we might be inclined to test our assay in a large human cohort with Acute Coronary Syndrome as an exploratory study.
Title:
Retrospective study characterizing outcomes of patients with pilonidal disease

Name:
Giancarlo Tabaro Marrero

Abstract:
Pilonidal disease is a common chronic inflammatory condition that affects more than 200,000 people in the U.S.A every year. (1) This illness is caused by an in-grown hair near the tip of the coccyx between the buttocks that leads to an accumulation of subcutaneous hair and skin debris. This can result in the formation of abscesses, cysts, cellulitis and sinus tracts. The in-grown hair causes follicular obstruction and enlargement that may lead to subcutaneous tissue rupture and persistent inflammation. (2) The exact cause that leads to the formation of ingrown hair is thought to be a product of friction and pressure that pushes hair down into the skin. (1) The risk factors for developing this condition include male sex, age under 20 years old, obesity, inactive lifestyle, occupation requiring prolonged sitting, excess body hair, and having stiff or coarse hair. (2)

The purpose of this study is to investigate the nature of pilonidal disease to be able to later compare the effectiveness of laser hair removal therapy to current treatment outcomes. Redcap was used to organize the data from Healthlink to later perform the data analysis. The study was composed of 722 UW subjects with a mean age of 25 years old (63.2% Male, 95.6% Non-Hispanic, 84.2 % White, 8.9% black) with a median BMI of 27.67 and a mean BMI of 29.15. The most common types of signs/symptoms that patients presented with when they saw the doctor were pain (49.3%), drainage (41.1%), and sub-optimal wound healing (22%). Most encounters took place either in a scheduled clinic visit (43.6%), OR visit (25.3%), or ER visit (21.8%). The incidence of surgery was 27.7% when compared to other treatments like antibiotics (34%) and incision and drainage (24.3%). The most common type of surgery was wide excision (77.5%) and the most common type of wound closure was secondary wound closure (75.7%). Most symptoms didn’t resolve within 30 days of treatment without additional interventions leading to a disease persistence of 41.1%. Disease recurrence defined as new symptoms after 30 days since last intervention or disease free-remission was 29.4%. These results will be compared to the prospective laser hair removal case-control study.
**POSTER 95**

**TITLE:** Barriers to Reducing Carbon-Footprint in Highly Carbon-Motivated Populations  
**AUTHORS:** Alexa Temme, Maggie Grabow, Mary Checovich, Gayatri Deshpande, Bruce Barrett

**BACKGROUND:** The WHO states that climate change is the biggest threat to global health in the 21st century. In the United States, over a third of the greenhouse gas emissions can be attributed to individual households’ electricity usage, driving, and food consumption. But ways to reduce this carbon footprint often also have a direct health benefit such as walking and biking instead of driving and reduced air pollution. The Mindful Climate Action program is aimed to take advantage of these co-benefits by using mindfulness training and climate education to help people to make changes that reduce their carbon footprint and improve their health.

**OBJECTIVE:** The goal of this study is to determine what the barriers are to individuals making changes to reduce their carbon footprint.

**METHODS:** 14 participants who had elected to participate in a pilot of the Mindful Climate Action program were interviewed prior to the study to assess what actions they have thought about taking and what obstacles prevented them from implementing these changes. Transcripts of the interviews will be analyzed to identify themes of the common barriers.

**RESULTS:** We have not yet done a full qualitative analysis, but several common themes have already emerged. Most people mentioned that they have thought about changing their transportation habits, but convenience and/or physical ability was a barrier. Several people also mentioned they have thought about eating less meat, but there is a barrier of convenience of their current dietary pattern and also a personal preference that they enjoy eating meat. Other barriers included not having thought about how to reduce the carbon-footprint in various aspects of their life, not having the knowledge needed to implement a change, and social situations preventing them from making the changes they would have liked.

**CONCLUSIONS:** There is a significant volunteer bias present, where individuals who care about the issues of climate change and are motivated to do something about it are more likely to enroll in this study, which makes this assessment of barriers unique. Therefore, the multiple barriers that these participants face will be even greater and more numerous for other subsets of the population. In order to reduce our greenhouse gas production as a society, we must consider these barriers and what can we do to address them.
TITLE: Women's Health Needs Assessment in San Lucas Tolimán, Guatemala: Community Partnership, Discoveries, and Next Steps

NAME: Taryn McGinn Valley, MD/PhD Candidate

BACKGROUND:
In the rural Central Highlands of Guatemala, a Catholic Church-affiliated NGO provides healthcare and outreach for thousands of families across 19 villages. Our partners, local health promotors, requested more information about women's health needs and opportunities for programmatic intervention.

OBJECTIVE:
Assess current state of women’s health in San Lucas Tolimán, Guatemala, and identify areas for intervention from local health promotors.

METHODS:
Across four representative communities, the survey assessed general health, prenatal care, pregnancy and birth, mental health, and cancer screening. 62 lay women were interviewed and two focus groups queried 26 health promotors. Interviewees, ages 18 to 74, represent a diversity of number of children, education, health status, age, and poverty level. In addition to delineating current access patterns and knowledge gaps of these rural communities, we conducted qualitative analysis over three months of participant observation in short-term medical volunteer work. Verbal informed consent, with cultural translation from health promotors, was obtained from all participants.

FINDINGS:
The health promoter program has an opportunity to expand cervical cancer screening, as women are eager for this resource, with over 50% having had a Pap smear before and 98% desiring further education. However, a majority of women express concern about risks of hormonal birth control and few (34%) decide to utilize it at all. Depression is widespread (33%) and there are few resources available. Women consistently identify poverty as the abiding barrier to regular healthcare.

CONCLUSIONS:
This research provides opportunities to develop further programming around cervical cancer, although follow-up is a critical roadblock. The pushback against birth control underlines a paradigm of Western biomedicine in patriarchal, indigenous communities. Ethnography and participant observation are powerful methodologies to elevate indigenous women’s voices. Additionally, it is imperative to critically examine the ethical implications of US-based short-term volunteer work and whether this is a viable approach to expanding healthcare in poor, indigenous communities.
POSTER 97

TITLE: Reconsidering the current U.S guidelines: aspirin dosing and its impact on preeclampsia, a systematic review and meta-analysis

NAME: Rachel Van Doorn

BACKGROUND: Hypertensive disorders of pregnancy remain a leading cause of maternal morbidity and mortality worldwide, accounting for more than 70,000 maternal deaths each year\(^1\). In all, 10-15% of maternal deaths are directly associated with preeclampsia and eclampsia\(^2\). In addition to being at increased risk for maternal and/or fetal mortality in the peripartum period, women diagnosed with preeclampsia are at an increased risk of cardiovascular disease later in life\(^3\). The USPSTF states that, universal aspirin prophylaxis for preeclampsia would save $365 million dollars in direct healthcare costs annually\(^4\). To reduce complications from this disorder, multiple studies have investigated the prophylactic use of aspirin in preventing preeclampsia in high-risk women. However, the specific recommendations for aspirin use as a preventative measure remain unclear; specifically, the most effective dose of aspirin therapy to administer.

OBJECTIVE: To investigate the optimal dose of acetylsalicylic acid (ASA) effective to prevent preeclampsia (PE) in high or moderate-risk women.

METHODS: A systematic review and meta-analysis of all randomized controlled trials (RCT) from 1/1984 to 1/2019 that studied the effect of ASA for PE prevention in high or moderate-risk women according to USPSTF guidelines. A subgroup meta-analysis was conducted on ASA dosing; < 81, 81, 100, and 150mg in all PE and preterm (< 37 week) PE. We followed PRISMA guidelines and utilized Covidence to manage the progress of our review. Articles were screened by 2 independent reviewers, with discrepancies settled by an independent 3rd party. Relative risks and risk differences, both estimated using random effect, were calculated with supporting 95% CI to quantify the effect of aspirin on PE.

RESULTS: 24 out of 1609 articles met criteria for our primary analysis. Comparing < 81 mg and >100 mg ASA respectively, demonstrated a 27.5% reduction (RR = 0.725; 95% CI: 0.581–0.905; p=0.005) and 25.5% reduction (RR = 0.745; 95% CI: 0.600–0.924, p=0.008) in PE diagnosis. Stratifying results for all PE diagnoses into the 4 doses demonstrated only the group < 81 and 150 mg group decreased PE risk with the NNT of 40 (95% CI: 22-142) and 31 (95% CI: 16-334) to prevent 1 case of PE. Only the 150mg dose demonstrated a significant reduction (62%) in preterm PE (RR=0.38; 95% CI: 0.20-0.72; P=0.007). The NNT using 150mg for preterm PE prevention is 39 (95% CI: 23-100).

CONCLUSIONS: We did not demonstrate a significant difference between ASA 81mg compared to other dosing strategies for PE reduction in high or moderate-risk women. However, ASA 150 mg demonstrates a significant reduction in preterm preeclampsia compared to all other dosing strategies. Further RCT's comparing the standard 81mg dosing to higher dosages are needed to further validate these findings. This has potential U.S practice implications and may indicate a necessary change.
REFERENCES:


Modeling White Matter Development and Symptom Severity in Autism Spectrum Disorder

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Background: Autism Spectrum Disorder (ASD) is a disorder of altered brain development. Yet, less is understood about how white matter (WM) changes over the lifespan in ASD and whether aberrant white matter development impacts ASD symptomology. Longitudinal data of white matter microstructure from individuals with ASD and typically developing controls (TDC) in relation to clinical measures of symptom severity are necessary to explain both deviant brain development in ASD and its contributions to the overall autism phenotype.

Objectives: To characterize and compare developmental trajectories of diffusion tensor imaging (DTI) metrics in individuals with ASD and TDC and to examine whether parameters of WM growth correlate with ASD symptomology.

Methods: Male participants (N = 224; 114 ASD) between the ages of 3 and 57 underwent longitudinal MRI scanning and completed clinical outcome questionnaires, such as the Social Responsiveness Scale (SRS). Mean fractional anisotropy (FA) were extracted from 25 defined WM regions. Linear, quadratic, exponential, logarithmic, Poisson, and Gompertz growth models were fit to regional FA data as a function of age for the ASD and TDC groups. Bayesian and Akaike Information Criterion (BIC; AIC) were used to determine the model of best-fit for each region, and these best-fit models were compared between groups. Participant-specific growth model parameters were extracted from each tract and correlated with Total Raw SRS scores.

Results: **ASD**: BIC and AIC comparison revealed Poisson, Logistic, Gompertz, and Quadratic growth models best represented the trajectories of 20, 2, 2, and 1 of the 25 WM tracts, respectively. **TDC**: Poisson, Logistic, and Exponential growth models best characterized the trajectories of 18, 4, and 3 tracts, respectively. The same model best fit the trajectory of 18 regions in both ASD and TDC groups, with the Poisson and Logistic models best fitting 16 and 2 of these regions, respectively. Due to issues with longitudinal model optimization, growth parameters from only 10 of the 18 WM regions were extracted for ASD individuals for correlational analysis with SRS. However, no significant correlations between SRS Scores and WM growth parameters were observed.

Discussion: Our analyses show that the process of WM development differs between those with and without ASD, with some WM regions showing an overall different developmental trajectory. Other regions follow a similar trajectory shape but have different growth parameters, suggesting ASD and TDC WM areas may differ in the extent or rate of growth. Many of the WM regions that differed in growth patterns between groups are WM structures that develop early in life, supporting the notion that autism is a condition of early deviant development. The lack of correlation between clinical outcomes and growth models indicates that WM development may not be strongly related to an individual’s ASD symptomology, however, these findings may be limited by ill-conditioning of the longitudinal mixed-effects models. Future work will focus on improving the growth model fitting as well as integrating other outcome measures, such as the Autism Diagnostic Observation Schedule, into our analyses.
TITLE: Chemotherapeutic DNA-damage to tumor-associated fibroblasts promotes tumor cell proliferation and therapeutic resistance

NAME: Ross Vitek

BACKGROUND: Prostate carcinomas develop in a complex environment that includes a diverse spectrum of cell types that influence tumor behavior. Components of this tumor microenvironment (TME) have been implicated in the development of chemotherapeutic resistance; however, the exact mechanisms remain largely unknown. Thus, acquired resistance to anticancer treatments remains a substantial barrier in reducing mortality in patients with advanced prostate cancer. Identifying specific mechanisms of resistance driven by cellular interactions within the TME will elucidate prognostic tumor markers as well as new therapeutic drug targets.

OBJECTIVE: The goal of this study was to investigate the role of patient-derived tumor-associated fibroblasts in cancer cell chemotherapeutic resistance. We hypothesized that DNA-damaging chemotherapeutics induce a secretory phenotype from prostate tumor-associated fibroblasts leading to cancer cell proliferation and therapy resistance.

METHODS: Here, we isolated patient-derived prostate tumor cells and tumor-associated fibroblasts from men with advanced prostate cancer. Then, we designed an in vitro chemotherapeutic dosing approach using automated fluid handling robots to increase our therapeutic screening throughput. Using this platform, we exposed tumor-associated fibroblasts to docetaxel and mitoxantrone chemotherapeutics, measuring the cells’ secretory phenotype and effects on tumor cell proliferation and therapy resistance.

RESULTS: We found that when exposed to docetaxel and mitoxantrone, patient-derived fibroblasts exhibit a secretory phenotype releasing inflammatory cytokines (IL-1B, IL-6, and IL-8), mitogens (AREG and EREG), and neurotropic factors (GDNF) known to drive tumor evolution. When co-cultured with prostate tumor cells, these secretory fibroblasts increased tumor cell proliferation and resistance to anti-tumor therapeutics in a patient-specific manner.

CONCLUSIONS: These results show tumor promoting effects from tumor-associated fibroblasts driven by DNA-damaging chemotherapeutics. This suggests that although drugs such as docetaxel have potent anti-tumor effects, the DNA-damage they induce in the tumor microenvironment may actually promote tumor evolution via paracrine signaling. The in vitro platform described here allows the study of patient-specific TME interactions to predict in-vivo therapeutic response and identify potential therapeutic targets.
Hormone Receptor Expression and Prognosis of Endometrial Serous Carcinoma: Defining the Threshold

Nhu Vu, Bradly Stelter, Dandi Huang, Mary J. Kao, Alain Cagaanan, Paul S. Weisman, Ahmed N. Al-Niaimi, Stephanie M. McGregor

Background / Objectives:
Endometrial serous carcinoma (SC) is an aggressive endometrial cancer (EC) that has classically been characterized by both p53 mutations and lack of estrogen receptor (ER). However, ER expression is increasingly being recognized in SC. The clinical interpretation of ER in EC is drawn from the breast literature, with “positive” being defined as ≥1% of tumor nuclei staining, and there is inconsistency between studies regarding its relationship to long-term oncology outcomes. The objective of this work was to assess recurrence-free survival and EC-related death in SC according to ER and progesterone receptor (PR) expression, comparing definitional cutoffs of 1% and 10% for positivity.

Methods:
A tissue microarray containing 82 successfully represented SC (supported by p53 and p16 stains) was stained for ER and PR. Stains were scored as >10%, 1-10%, or <1%. Comparisons were drawn in parallel using a breakpoint of 10% or 1% to constitute positive for each individual stain. Markers were analyzed in relation to EC-related death and recurrence-free survival using Chi-Square and Kaplan-Meier analyses.

Results:
ER was present in >10% of tumor nuclei for 57/82 (69%), 1-10% in 8/82 (10%) and <1% in 17/82 (21%). PR was present in >10% of tumor nuclei for 37/82 (45%), 1-10% of 18/82 (22%) and <1% in 27/82 (33%). ER negativity, when using a 10% threshold for positivity, was associated with a significant increase in both EC-related death (41% vs. 17%, p=0.031) and recurrence-free survival (56% vs. 32%, p=0.036). There was no significant association of ER negativity with EC-related death or recurrence-free survival using the 1% threshold (33% vs. 22%, p=0.362; 47% vs. 37%, p=0.446, respectively). PR negativity, when using the 10% threshold, was associated with a significant increase in recurrence (49% vs. 27%, p=0.043) but not in EC-related death (29% vs. 19%, p=0.341). Univariate Kaplan-Meier analysis also demonstrated improved recurrence-free survival in UPSC with >10% expression of ER (p=0.0156) and PR (p=0.0313).

Conclusions:
Though current practice defines positivity for ER and PR as nuclear staining in ≥1% of tumor cells, a threshold of 10% is more predictive of prognosis in terms of both recurrence and EC-related death. Using 10% as a threshold for positivity, ER negativity in SC is associated with both reduced survival and increased recurrence, while PR negativity is associated with only increased recurrence.
Background: Opioid misuse and resulting overdose deaths have reached epidemic proportions in the United States. For many, the opioids prescribed for pain relief after surgery represent their first exposure to the drug. With the substantial morbidity and mortality surrounding opioid misuse, there is an urgent need for data that will guide opioid prescription practices in the post-operative setting.

Objective: The principal aim of this study was to assess the use of prescribed opioids after urologic surgery and identify factors that are associated with opioid use.

Methods: This prospective study consisted of opioid naïve patients, defined as no opioid use in the 90 days preceding surgery, who were undergoing urologic surgery at the UW Hospital or the William S. Middleton Memorial VA. Before surgery, a series of questionnaires were completed with the patient including a validated questionnaire called the Screener and Opioid Assessment for Patients with Pain-Revised (SOAP-R), a pain assessment tool (PEG), and a Fear of Pain questionnaire (FPQ-9). Follow up interviews conducted at 1-3 days, 2 weeks, and monthly until 6 months post-operation consisted of the PEG assessment and a quantification of pills taken. Univariable logistic regression was performed to assess for predictors of use and use of 10 or more opioid pills with the baseline SOAPP score, FPQ9 score, 1-3 day post-operative PEG score, and the total number of pills prescribed as predictor variables of interest.

Results: On average, n=24 patients consumed 5.3 pills after surgery (SD 8.47), and 50% (12/24) took no pills after surgery. The baseline SOAPP score and the FPQ9 score were not associated with patients taking pills nor patients taking more than 10 pills. Factors that were associated with patients taking pills after surgery were the 1-3 day post-operative PEG score (OR 1.41, p>0.05) and the total number of pills prescribed (OR 1.14, p>0.05). Total pills prescribed was also associated with the use of over 10 pills after surgery (OR 1.14, p>0.05).

Conclusions: These results suggest that the strongest predictor of increased opioid use after urologic surgery is the number of pills prescribed. Patients that were prescribed more tended to take more for unclear reasons. Providing more data to surgeons about how patients use opioids in the post-operative setting and what factors are associated with increased use will help guide efforts to adequately treat their patients’ pain while decreasing rates of opioid misuse.
POSTER 102
Determining Islet Cholecystokinin Expression in Diet – Induced Diabetogenic Conditions

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University of Wisconsin School of Medicine and Public Health¹ Department of Medicine, University of Wisconsin-Madison²

BACKGROUND: Type 2 Diabetes Mellitus (T2D) is a disease characterized by a deficiency of pancreatic β-cell mass. During insulin resistance, β-cells are unable to compensate for the increased insulin requirement. β-cell apoptosis also occurs in T2D due to a variety of stressors (¹,²). Current therapeutics for T2D do not prevent β-cell death. Cholecystokinin (CCK) is a gut peptide hormone that is also produced by pancreatic β-cells and upregulated in conditions of islet stress and obesity. CCK appears to play a role in protecting β-cell mass, for example in the severely obese leptin deficient mouse model (³). CCK may have therapeutic potential for maintaining β-cell mass; however, the mechanisms by which CCK upregulation occurs in various diabetogenic conditions have yet to be elucidated.

OBJECTIVE: To determine if CCK is upregulated under diet-induced diabetogenic conditions. We hypothesize that a short-term and long-term high fat diet (HFD) will cause an increase in islet CCK expression.

METHODS: Hyperglycemia and obesity were induced in a CCK-eGFP transgenic male mice (mixed background strain) with a 60% kcal HFD for either 5 or 18 weeks (n=4). Body weight, fasting blood glucose, and glucose tolerance tests (GTT) were performed at regular intervals throughout the diet. Pancreas was harvested at the conclusion of the HFD, sectioned, and stained with immunofluorescent antibodies for GFP, glucagon, insulin, and DAPI, then imaged with confocal microscopy. Islets were quantified using ImageJ software (n=20 per mouse). Islets from CCK-eGFP transgenic mice fed a standard chow diet and non-transgenic mice fed chow diet were analyzed for comparison.

RESULTS: Short-term and long-term HFD induced hyperglycemia and increased body weight. A slight increase of islet CCK expression was observed in the 5-week HFD mice compared to the chow diet CCK-eGFP mice (data analysis is ongoing). 18-week HFD mice showed some expression of CCK (data analysis is ongoing). Of note, observed islet CCK expression was limited to primarily β-cells.

CONCLUSION: Preliminary results suggest that a 5-week HFD induces hyperglycemia and trends towards an increase of CCK. Presumably, the 18-week HFD will also trends towards an increase in CCK expression after optimization of data analysis. Moving forward, alternatives such as an insulin receptor antagonist and streptozotocin will be used to induce a diabetogenic condition. We will continue our experiments using lineage tracing mice to delineate potential de/transdifferentiating CCK producing cells.

References

POSTER 103

TITLE: Inter-Rater Reliability of the Prone Apprehension Relocation Test (PART)

NAME: Lauren E. Watchmaker

BACKGROUND: Hip dysplasia and related instability can cause osteoarthritis, pain, and can limit hip function. The Prone Apprehension Relocation Test (PART) is a recently described provocative maneuver for hip instability that is particularly useful for patients with borderline or ‘occult’ hip dysplasia, which may not be identified with other clinical maneuvers or standard radiographic evaluation. Reproducibility of the PART between examiners has not been previously studied.

OBJECTIVE: To quantitate the inter-rater reliability of the PART between healthcare professionals.

METHODS: We retrospectively identified patients in our institution’s hip preservation registry who presented between September 2017 and June 2019 for evaluation of hip pain. Patients included in the study had the PART performed by two healthcare professionals who were blinded to the other’s results. Inter-rater reliability was assessed using the Cohen $\kappa$, with a value of $\kappa \geq 0.75$ considered excellent inter-rater reliability, $0.74 < \kappa > 0.40$ moderate, and $<0.40$ poor.

RESULTS: 96 patients (190 hips) were included, with 63 females and 35 males, average age 32±12.1. 23 hips had a positive PART from both examiners. Inter-rater reliability was excellent between providers for the PART when evaluating the right hip ($\kappa = 0.80$, p<0.001), left hip ($\kappa = 0.82$, p<0.001), and when combining the results for left and right ($\kappa = 0.81$, p<0.001). A sub-analysis of patients who had a positive PART from both raters demonstrated that 19 of the 23 hips had a lateral center edge angle (LCEA) >25°.

CONCLUSIONS: This study demonstrates that there is excellent inter-rater reliability among healthcare professionals who performed the PART and confirms that the PART can identify patients with ‘occult’ dysplasia that is not identified by radiographic measurement of the LCEA. Based on our study, the PART may offer the clinician an additional reliable maneuver in the assessment of patients with hip pain.
POSTER 104
The Effect of Blood Thinners on Chest Related Imaging and Outcomes for Geriatric Patients Presenting to the ED with Ground Level Fall
Jeremy Williams

Background: Ground level falls are the most common cause of all trauma-related injuries in the U.S. elderly population. While blood thinners have been shown to increase morbidity and mortality in fall-related head trauma, data is lacking in understanding the potential effects of anticoagulation and anti-platelet medication on fall-related chest imaging practices and outcomes of geriatric patients presenting to the Emergency Department (ED).

Objective: The purpose of our study was to determine if blood thinner status has a significant ability to predict ED imaging practices and outcomes of fall-related chest complications.

Methods: A randomized retrospective chart review was performed on 1,048 patients presenting to the UW ED between Jan 2015 through July 2019. Inclusion criteria included age ≥65 and chief complaint of “fall”. Exclusion criteria included transfers from outside EDs, non-ground level falls, and positive hospice/palliative care status. Demographic, clinical, and lab data for each patient was collected through automatic and manual chart abstraction. Univariate and multivariate analyses were conducted to assess association and predictability of non-aspirin blood thinner status on chest-related ED imaging practices and patient outcomes. Severe chest-related outcomes (SCROs) included mortality, surgery, ICU admission, and intubation. Mild chest-related outcomes (MCROs) included admission, parenteral opioid treatment outside the ED, O2 supplementation outside the ED, 3 ≥ fractured ribs, and return to an ED ≤ 30 days from the fall-related chest injury.

Results: Of the 1,048 patients evaluated, 499 were on blood thinners at the time of the fall. Multivariate logistic regression analysis demonstrated that positive blood thinner status on ED arrival does not have a significant effect on predicting ordering practices of chest x-rays (OR: 2.54; 95% CI [0.783, 8.25]) or chest computed tomography scans (OR: 0.628; 95% CI [0.31, 1.27]). Additionally, positive blood thinner status at ED arrival does not predict the risk of MCROs (OR: 0.546; 95% CI [0.185, 1.61]) or SCROs (OR: 0.291; 95% CI [0.39, 2.18]).

Conclusion: Controlling for confounding variables such as trauma activation, reported chest pain, and chest wall tenderness on physical exam revealed that blood thinner status does not have a major role in predicting chest imaging practices or chest related morbidity and mortality after a geriatric ground level fall.
TITLE: Quick MRI for Abscess Drainage in Pediatric Patients

BACKGROUND: Quick MRIs for abscess identification in pediatric patients have been described as they provide complete evaluation of the abdomen and pelvis but do not require radiation, sedation, breath holds, or contrast.

OBJECTIVE: To assess the use of quick MRI in the setting of percutaneous drain management in pediatric patients.

METHODS: A retrospective medical record review was conducted to compare quick MRI to CT and ultrasound in the pediatric percutaneous drain placement setting. The quick MRI protocol consists of axial single-shot-fat-spin-echo (SSFSE) and fat-saturated SSFSE coronal sequences, and previously has been reported to take approximately 6 minutes of scan time. The study included 111 patients under 18-years-old having undergone percutaneous drain placement between January 2014 and January 2019. Data collected included pre- and post-drain imaging and clinical outcomes for comparison between modalities. Primary clinical outcomes included number of additional drain placement procedures, complications, length of hospitalization, and repeat drainage within 6 months following drain-free interval. The use of MRI post-procedurally was also investigated.

RESULTS: Prior to drain placement, 37 patients had quick MRIs, 8 had standard MRIs, 52 had CTs, and 14 had ultrasounds. Patients with pre-drain quick MRIs instead of CTs had no significant difference in the need for additional drain placement (p = 0.738), length of hospitalization (p = 0.192), or drainage complications (p = 0.728). Patients with pre-drain standard MRIs instead of CTs had no significant difference in the need for additional drain placement (p = 0.138) or hospitalization length (p = 0.792). Pre-drain standard MRI was observed to correlate with a higher rate of drainage complications (p = 0.008). Following drain placement, 22 patients had quick MRIs, 11 had standard MRIs, 7 had CTs, and 26 had ultrasounds. Patients receiving quick MRI for follow-up imaging post-drain placement had no greater rate of repeat drainage within 6 months of initial drain discontinuation (p = 0.90) when compared to patients having CTs and ultrasounds.

CONCLUSIONS: Pre and post-drain procedure quick MRIs were found to be equivalent to CT and ultrasound in regard to several key clinical outcomes. These findings lend further support to use of quick MRI for identification and management of pediatric fluid collections.
POSTER 106
What is the Optimal Treatment of Low Grade Chondroid Lesions of Long Bones: A Retrospective Review of 476 Patients

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INTRODUCTION: Low grade chondroid lesions including cartilaginous enchondromas (EC) and atypical cartilaginous tumors (ACT) are often indistinguishable clinically, radiographically and histologically. While this proves challenging for clinicians, the question of optimal treatment also remains unclear. It is known that malignant transformation and recurrence among low grade chondroid lesions, particularly enchondromas, is low ranging from 1-13%. However, treatment choice still remains highly individualized. Our study aims to characterize patient outcome as well as the long-term behavior of EC and ACT in the conservative and surgical treatment setting.

METHODS: We retrospectively reviewed 476 patients diagnosed with low grade chondroid lesions in the long bones. We included patients who had an orthopaedic visit between 1990 and 2015 with at least two years of follow-up. Patients with concurrent hematogenous cancers were excluded.

RESULTS: Of the 476 patients 294 (61.8%) were diagnosed with EC, 138 (29.0%) with ACT, 35 (7.4%) with both EC and ACT in the same lesion and 9 (1.9%) with an indeterminate low grade chondroid lesion (ILG). There was a higher proportion of females with low grade chondroid lesions compared to males (68.7% versus 31.3%). 246 (51.7%) patients had surgery at our institution while 230 (48.3%) underwent conservative treatment. The indications for surgery included 117 (50%) initial radiologic findings, 45 (19.2%) radiologic findings and pain, 22 (9.4%) changes in tumor size, 18 (7.7%) increasing pain over time, 12 (5.1%) unknown, 9 (3.8%) radiologic changes over time, 9 (3.8%) personal choice (mainly due to anxiety), and 2 (0.9%) pathologic fractures. The most common surgery performed was curettage with various types of reconstruction with 127 (51.6%) patients. 7 (1.5%) local recurrences occurred postoperatively with 100% of them occurring after curettage with reconstruction. After surgery, 30 (12.2%) patients had complications requiring additional surgery and 19 (7.7%) complications not requiring surgery.

DISCUSSION: The low rate of local recurrence supports feasibility of curettage with cryosurgery of those lesions. The number of complications requiring surgery in our study confirm the general recommendation that indication for surgery should be discussed more thoroughly. Careful selection of patients treated with active surveillance is important since distinction between benign and malignant chondroid lesions remains challenging.