

UNIVERSITY OF COLORADO
DENVER
ANSCHUTZ MEDICAL CAMPUS

ANNUAL STUDENT MSA CAPSTONE
PRESENTATIONS

MARCH 5, 2015
ANSCHUTZ MEDICAL CAMPUS
HEALTH AND SCIENCES LIBRARY

UNIVERSITY OF COLORADO DENVER
ANSCHUTZ MEDICAL CAMPUS
MSA CAPSTONE PRESENTATIONS

Thursday, March 5, 2015

Poster Sessions

Session A: 1:00 pm – 2:00 pm

Session B: 2:15 pm – 3:15 pm

Session C: 3:30 pm – 4:30 pm

ANSCHUTZ MEDICAL CAMPUS
Health Sciences Library

The MSA Directors to acknowledge, with gratitude, the support for medical student research provided by:

The University of Colorado Denver
School of Medicine Dean's Office
And
Undergraduate Medical Education Office

Poster Session Judges

The organizing committee wishes to acknowledge their appreciation to the following serving as judges for the MSA Capstone Presentations. Without their generous contribution of time and talent the forum would not be possible. Thank you!

David OrlickyOrlicky ,
Suzanne Osorio Lujan , DVM, MSc, MAS
Karin Payne , PhD
Mark Petrash , PhD
Megan Petrik , PhD
Miriam Post , MD
kameswaran ravichandran , Ph.D
Kelet Robinson , MD
Corry Robinson-Rosenberg , PhD; RN
Olivia Romano , MD
Daphne Rommereim-Madden , MD, MPH, FAAFP
Isabel Schlaepfer , PhD
Halden Scott , MD
Kristin Stratton , MD
Meredith Tennis , PhD
Tamara Terzian , PhD
Lynn VanderWielen , PhD, MPH
Erik Wallace , MD
Rui Zhao ,
Tatiana Oliveira , MD
Aaron Knox , PhD

Abstracts

Matthew Miller

Project Title: Establishing Need for and Barriers to Formation of Medical-Legal Partnerships

Thematic Area: Public Health and Epidemiology

Abstract: Background: There are significant disparities in health across racial, ethnic and socioeconomic lines. Medical-Legal Partnerships (MLP) provide a path to addressing sociolegal issues that affect patient health. To date, MLP studies have focused on program descriptions, and have not sought to characterize the families that have sociolegal needs, nor on optimizing screening strategies. While many of the factors contributing to disparities are well-known, little is known about the role of unmet legal needs. Objectives: 1) To characterize families who present with sociolegal need, examine demographic associations with expressed medical legal need, and the information gained with sequential screenings in a clinic setting. 2) To measure the prevalence of legal needs, and whether legal needs were associated with demographic characteristics, poor health, non-English language preference or other factors in the patient population at a hospital-based Emergency Department (ED). Methods: During a 30-month study we collected demographic information and screened parents for housing, benefits, and safety concerns at well-child visits and asthma clinic encounters. Over a 1-week period, a 29-item written survey (English and Spanish) was offered to families in the waiting room at the University of Colorado Hospital ED. We performed chi-square analysis for each variable to determine demographic factors that positively correlated with identified sociolegal need, reporting odds ratios (OR) with 95% confidence intervals (CI). Results: 8803 screenings were obtained from 5008 unique patients. Twenty-six percent of families screened positive at least once over the study period. Thirty eight percent of families were screened more than one time. Children aged 5-12 and >12 years had significantly higher rates of positive screening compared to those <1 year (OR 1.604 95% CI 1.39-1.84 and 1.34, 1.01-1.78, respectively). Those with a non-English primary language screened higher for sociolegal need than primary English speakers (OR 1.58, 1.40-1.79). Lack of insurance and Medicaid were each associated with increased positive screening compared to private insurance (OR 1.66, 1.24-2.23, and OR 1.36, 1.16-1.60, respectively). ED surveys were collected from 325 patients. Overall, 64% (59-70%) reported at least one legal problem in the past 12 months. Of these, 33% (26-39%) stated that their legal problem(s) had an adverse impact on their health; 89% (84-93%) had no access to legal services. Legal problems were associated with annual income less than \$25,000 (OR 2.17, 95CI 1.32-3.57), unemployment (2.29, 1.34-3.91) and unstable housing (3.76, 1.28-11.05). Conclusion: Our high rate of expressed legal concern over time suggests that screening families on more than one occasion is an important strategy to detect need. If our associations are confirmed, MLPs may consider focusing resources by targeting screening of families with older children and those who are uninsured or on Medicaid (as well as those with a non-English primary language and those with complex illness.) In the ED survey, unmet legal needs were common and may be

associated with adverse health outcomes. Additional studies are needed to ascertain the impact of screening for legal need, and of medical-legal partnerships on health outcomes.

Abstracts

Pukurdpol Paul

Project Title: Association of Medicare and Medicaid insurance with increasing primary care-treatable emergency department visits in the United States.

Thematic Area: Public Health and Epidemiology

Abstract: **OBJECTIVES:** Policymakers have increasingly focused on emergency department (ED) utilization for primary care-treatable conditions as a potentially avoidable source of rising health care costs. The objective was to determine the association of health insurance type and arrival time, as indicators of limited availability of primary care, with primary care-treatable classification of ED visits. **METHODS:** This was a retrospective analysis of a nationally representative sample of 241,167 ED visits from the 1997 to 2009 National Hospital Ambulatory Medical Care Surveys (NHAMCS). Probabilities of ED visits being primary care-treatable were categorized based on the primary International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code. The association of health insurance type and arrival time was determined with the average probability of the primary diagnosis being primary care-treatable using multivariable linear regression. **RESULTS:** Compared to privately insured visits, Medicaid visits had a 1.7% (95% confidence interval [CI] = 1.2% to 2.2%) and uninsured visits a 2.4% (95% CI = 1.9% to 3.0%) higher probability of primary care-treatable classification, while Medicare visits had a 1.4% (95% CI = 0.7% to 2.0%) lower probability during the overall study period. Compared to business hours, weekend visits had a 1.5% (95% CI = 1.0% to 2.0%) higher probability of being primary care-treatable during the overall study period. From 1997 to 2009, the overall adjusted probability of ED visits being primary care-treatable increased by 0.19% (95% CI = 0.10 to 0.28) per year. This probability increased at a rate of 0.52% per year for Medicare visits (95% CI = 0.38% to 0.65%), more than double that of Medicaid visits (0.25% per year, 95% CI = 0.13% to 0.37%). By contrast, there was no significant change from 1997 to 2009 in the average probability of ED visits being primary care-treatable by privately insured (0.05% per year, 95% CI = -0.07 to 0.16) or uninsured (0.00% per year, 95% CI = -0.12 to 0.13) individuals. **CONCLUSIONS:** These findings add to prior work that implicates insurance type and arrival time in the variation of primary care-treatable ED visits. Although primary care-treatable classification of ED visits was most associated with uninsured or Medicaid visits, this classification increased most rapidly among Medicare visits during the study period.

Abstracts

Sandhu Stephanie Natassia

Project Title: Review of the Current Aurora School Based Health Care System and Recommendations for Expansion

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: School Based Health Centers (SBHC) provide expanded healthcare services to students in almost 2,000 schools in the United States. This paper provides an introduction to school based health centers, a literature review of their impact, and provides an overview of the current school based health center system provided in Aurora Public Schools. Subsequently, a review of Aurora's health needs and inequalities and potential barriers to expansion will be utilized to discuss recommendations regarding the value and feasibility of expanding the current school based health center system in Aurora.

Abstracts

Sorrentino Talia Ann

Project Title: The Effect of Damage Control Surgery on Major Abdominal Vascular Trauma

Thematic Area: Clinical Research

Abstract: Background: In 1982, we reported our experience with abdominal vascular trauma, highlighting the critical role of hypothermia, acidosis, and coagulopathy. Damage control surgery was subsequently introduced to address this “lethal triad.” The purpose of the present study was to evaluate the outcomes from our most recent 6-year experience compared with a cohort from 30 years ago. Methods: Patients with major abdominal vascular injuries were examined, and the most recent 6-year period was compared with archived data from a similar 6-year period three decades ago. Results: The number of patients with major abdominal vascular injuries decreased from 123 patients in 1975 to 1980 to 64 patients in 2004 to 2009. The mean initial pH decreased from 7.21 to 6.96 (1975 to 1980 versus 2004 to 2009) for patients with overt coagulopathy. Despite increasingly protracted acidosis, mortality attributable to refractory coagulopathy decreased from 46% to 19% (1975 to 1980 versus 2004 to 2009, chi-square χ^2 4.36, P P 0.04). No significant difference was found in mortality from exsanguinating injuries (43% versus 62%, 1975 to 1980 versus 2004 to 2009, chi-square χ^2 1.96, P P 0.16). The prehospital transport times were unchanged (22 versus 20 min, 1975 to 1980 versus 2004 to 2009). Despite the administration of additional clotting factors and the advent of damage control surgery, the overall mortality remained largely unchanged (37% versus 33%, 1975 to 1980 versus 2004 to 2009, chi-square χ^2 0.385, P P 0.53). Conclusions: The adoption of damage control surgery, including the implementation of a massive transfusion protocol, was associated with a reduction in mortality for abdominal vascular injuries due to coagulopathy; however, patients have continued to die of exsanguination.

Abstracts

Loberg Jacey Ane

Project Title: The Changing Landscape of General Surgery in Rural Colorado

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Background The future of rural general surgery in Colorado and other rural states is in jeopardy due to a combination of factors. An increasing trend toward specialization, movement into urban areas, and fewer resources in rural hospitals are among many reasons behind the impending "crisis" within rural surgery. The broad scope of surgical practice encountered in rural Colorado was well described in a 1981 paper by Majure and Abernathy, however the current state of rural surgery has certainly changed. This study aims to look at the current scope of practice of rural surgeons in Colorado, in the midst of unfavorable changes for rural general surgery across rural America. Methods Surgeons practicing at Colorado Critical Access Hospitals and within counties designated as rural or frontier, were surveyed by phone, mail, or in-person interview. Surgeons were asked about the types of operations they perform, the currently unavailable procedures that are needed within the region, the estimated amount of time devoted to the various aspects of their practice, and whether or not they also serve a primary care role. It was also determined whether or not surgeons practice at additional hospitals in the same or other counties. General demographic information was also collected. Results— pending data collection Conclusions—Rural surgery faces a unique set of challenges, including economic strain, surgeon recruitment, professional isolation, and inadequate training for a broad scope of practice. These challenges have become increasingly complex over recent decades. The data collected from this study will be used to assess the current and future needs within rural surgery in Colorado, as well as identify aspects of practice which warrant extra focus throughout training for resident surgeons preparing for rural practice.

Abstracts

Allen David Michael

Project Title: Relationship between Exercise and Cystic Fibrosis (CF)

Thematic Area: Basic Science

Abstract: A review of the literature in search of studies showing objective data of how lung function is influenced by exercise. This was undertaken since there is a lot of subjective information in the CF community and no specific references are made to any studies that have shown a positive, measurable, effect on the lungs as a result of exercise. 3 electronic databases were searched looking for articles pertaining to “Cystic Fibrosis and Exercise” of primary research. In addition, all articles passing initially screening were further examined in their references for other journals that could shed light on this topic. This topic proved to be of great challenge to find a lot of primary research specific to this topic. However, from the research there was data showing an increase in sputum production associated with exercise 1 8, slowed decrease in FEV1 2 0, 21, and improved FEV1 and FVC changes 1 9, 20 over short and long study durations. In summary, objective data does exist in regards to lung function and exercise in CF that is positive, but is limited and not always consistent between studies due to the vast nature of exercise and which types of exercises are studied.

Abstracts

Martinez Roxanne Christine

Project Title: Screening for Prostate Cancer in the Elderly

Thematic Area: Clinical Research

Abstract: Prostate Cancer screening is extremely controversial these days. Although 30,000 men die annually of the disease, a large randomized PLCO trial (although many patients in the non screening arm were screened) in the USA showed no survival advantage for screening (rate ratio: 1.15; 95% CI: 0.86-1.54). In addition, despite large screening efforts in the USA, the rate of death from prostate cancer has largely remained unchanged. Despite the negatives to screening, a very large randomized European trial showed that screening for prostate cancer does save lives. The American Urologic Association continues to support annual PSA and rectal exams beginning at age 40 years. Thus the debate still continues for an individual young man and prostate cancer screening. To sustain healthcare in the USA in the future, every dollar will need to be used wisely. Although new tests may have better sensitivity and specificity for prostate cancer and may even be better able to identify who has a lethal phenotype, screening for prostate cancer in men over the age of 65 years is not the best use of our limited resources.

Abstracts

O'Meara Melissa

Project Title: Impressions of PPACA

Thematic Area: Public Health and Epidemiology

Abstract: The Patient Protection and Affordable Care Act of 2010 created state-run high risk pools that were designed with a targeted obsolescence date of January 1st, 2014— the date when it would be possible to obtain private insurance even with a pre-existing condition. In mid-2012, plans began to plan how to conclude coverage. To answer the questions of how and what to communicate to members, CoverColorado commissioned this study based opinions and concerns expressed in focus groups of their membership.

Abstracts

Feven Tesfalidet

Project Title: Evaluation of a community health worker training program in the Peruvian Amazon through in-depth stakeholder interviews

Thematic Area: Global Health

Abstract: Community Health Workers (CHWs) are an important link between rural river communities and health centers in the Loreto region of Peru. Comunidades Unidas Peru (CUP) is a not for profit organization that trains CHWs in Loreto and facilitates relationships between their communities, local health care centers and the Peruvian Ministry of Health. As part of a program evaluation, CUP performed in-depth stakeholder interviews with CHWs, community members (CMs), health officials and partner NGOs. CUP sought to define current roles of CHWs, local health problems, desired functions of CHWs and suggestions for how to improve CUP's efforts. Rural CMs experienced many maternal-child health problems, infectious diseases, chronic diseases and problems with domestic abuse. Barriers to health included economic and infrastructural barriers as well as lack of trust in the health system. CHWs worked as public health advocates, triage providers and treatment providers; however the amount of time they could spend on CHW duties was limited. Improving CHWs efficacy will require improving internal and external incentives as well as improved supervision.

Abstracts

Weise-Fleckenstein Maria Daniela

Project Title: Treatment of Chronic Pelvic Pain: A Literature Review

Thematic Area: Clinical Research

Abstract: Chronic pelvic pain (CPP) is a complex and troubling issue facing approximately 38/1000 women making it similar to the prevalence of back pain [1]. Quality of life is decreased and a significant financial burden is experienced through loss of work hours and productivity, disability, and healthcare utilization for symptom management. Outpatient medical costs alone for chronic pelvic pain were estimated at \$881.5 million per year among women 18-50 years of age [2]. The total healthcare cost has now skyrocketed to an estimated 2 billion annually [3]. Further adding to the suffering of these women is the substantial delay in diagnosis. On average, it takes 6.7 years for a woman developing pelvic pain to arrive to the point where she undergoes laparoscopic evaluation for pelvic pathology [4]. Over the years, endometriosis, pelvic congestion, painful bladder syndrome, and other pathologies have been examined in order to improve the understanding of the sources of pain in hopes of identifying treatment options. More recently, a multidisciplinary approach has been considered for treatment as the diagnosis is one of exclusion and is also believed to be of multifactorial etiology rather than arising from a single source [5]. Strong associations have been identified between chronic pelvic pain and history of abuse, pelvic pathology, and psychological morbidity increasing suspicion there may be a causal relationship [1]. With the large number of women experiencing CPP, its important that clinicians are familiar with current treatment options in order to counsel their patients appropriately and make necessary referrals. The goal of this paper is to highlight a few common options in surgical, medical, and neuronal management.

Abstracts

Huzyk Theodore Nicholas

Project Title: Effect of recording an agitational “vital sign” on reducing assault risk in an inpatient psychiatric unit

Thematic Area: Clinical Research

Abstract: Much research has been done to validate the multitude of violence risk assessment tools, but few studies have investigated whether the implementation of such risk assessments on inpatient psychiatric units has resulted in safer units. The current study aims to evaluate the degree of assaultiveness on the adult inpatient psychiatric unit at Denver Health during the year following standardized charting of each patient’s Behavioral Activity Rating Scale (BARS) score as an agitational vital sign. The one year prior to BARS implementation is used as a control period. Current data are preliminary, but indicate a small increase in the total number of severe assaults, from 39 during the control period (2013 calendar year) to 47 during the experimental period (2014 calendar year). Population data is still pending, though it is likely that this small increase will also be observed when considered as a rate per hospitalization days. A discussion follows emphasizing the utility of such scales in fostering precautionary communication amongst healthcare providers as well as the need to more thoroughly integrate the BARS scale into the awareness of health staff in the future.

Abstracts

Ayres Lauren Elizabeth

Project Title: Legal Needs among Urban Safety Net Clinic Patients

Thematic Area: Public Health and Epidemiology

Abstract: A survey was presented to all families at an urban safety net clinic. Participants were asked if they had experienced legal problems in the last year, and the impact of the problem(s) on their health. Surveys were collected from 602 patients. Most were under age 40 (56%), female (74%), Hispanic (73%), and indigent (79%). Significant proportions never graduated from high school (37%), reported “fair”/“poor” health (36%) and reported limitations ADLs (31%). Overall, 403 (66.9%; 95CI: 63.2-70.7) reported at least one legal problem in the past year, 135/321 (42.1%; 95CI: 36.8-47.5) stated their legal problem(s) caused or exacerbated a health condition, and 241/288 (83.7%; 95CI: 79.4-87.9) reported no access to legal services. Legal problems were associated with: poor health (OR: 1.81; 95CI: 1.16-2.82), impaired ADLs (OR: 1.89; 95CI: 1.26-2.86), under-employment (OR: 1.68; 95CI: 1.15-2.46), unstable housing (OR: 2.93, 95CI: 1.21-7.08), and annual income <\$25,000 (OR: 1.92; 95CI: 1.23-2.96).

Abstracts

Kennedy Laura Christine

Project Title: The effect of curanderismo on non-malignant chronic pain: A case report

Thematic Area: Clinical Research

Abstract: Objective: This case study describes the effects of the use of curanderismo, an indigenous healing modality combining techniques in massage, sound, and aromatherapy, on chronic pain. Setting: An adult patient with chronic, opioid dependent back pain following an injury and subsequent spinal fusion was treated. Intervention: The patient received 33 curanderismo treatment sessions over 10 months in addition to ongoing conventional treatment at a community-based chronic pain management clinic. Main outcomes measures: self-reported assessments of pain, functional ability, mood, insomnia, and narcotic usage Secondary outcome measure: qualitative interview Results: Although there was no change in quantitative self-reported pain measures, the patient reported improved function, mood, and sleep as well as decreased narcotic usage Conclusions: Curanderismo, in addition to conventional pain management, improved patient reported symptoms and functional ability, led to healthy lifestyle changes, and decreased narcotic usage. Controlled studies are needed to confirm the benefit of curanderismo as safe, non-interventional, cost-effective adjunct for chronic pain management.

Abstracts

Gonzalez Joseph Robert

Project Title: SPRR gene dysregulation in chronic rhinosinusitis

Thematic Area: Basic Science

Abstract: Background. Small protein-rich proteins (SPRR) are a novel class of polypeptides that contribute to the biomechanical properties of the epithelium, recently found to be associated with TH2 inflammation. There is evidence that genetic polymorphism in SPRR genes could be predictive for the development of asthma in atopic children and correlatively, that expression of SPRRs is increased under allergic conditions. Methods. RNA from uncinate tissue specimens from 4 patients with chronic rhinosinusitis and allergy (CRS/AR) and 4 healthy controls was evaluated by deep sequencing, quantitative PCR, and microarray analysis. A separate cohort of archived sinus tissue was examined by immunohistochemistry. Results. We report (1) a statistically significant increase of SPRR expression in uncinate mucosa collected from CRS/AR patients and (2) a concordant dysregulation of numerous TH2 inflammatory targets. SPRR1 and SPRR2A expression was increased in CRS patients by a fold change of 42.43 ($p = 0.0008$) and 112.5 ($p = 0.0001$), respectively, on deep sequencing. Differential expression was confirmed with real-time PCR. Gene array analysis revealed upregulation of IL13RA2 (fold change = 4.112) and downregulation of multiple TH2 gene targets including AREG, CSF3R, IL1RL1, CCL24, and IL21 in patients with CRS/AR. Immunohistochemistry of archived surgical samples revealed consistent staining of SPRR in squamous epithelium of both diseased and control patients. Conclusions. Expression of SPRR1 and SPRR2A is increased in mucosal samples from CRS/AR patients, which may reflect squamous metaplasia. Further study is warranted to determine if this gene family plays a role in the TH2 inflammatory skew noted in these patients.

Abstracts

Sakala Sakala

Project Title: Educational Activity Aimed at Improving Health Knowledge and Reducing Sugar Sweetened Beverage (SSB) Consumption

Thematic Area: Public Health and Epidemiology

Abstract: Title: Educational Activity Aimed at Reducing Sugar Sweetened Beverage (SSB) Consumption Purpose: To develop and assess an activity for adolescents in order to increase knowledge and awareness of the potential health hazards of SSB's, as well as monitor whether or not a behavior change in regards to patterns of SSB consumption will occur after participating in a month long educational activity. Background: Approximately two-thirds of adults in the United States today are overweight or obese, and compared to a person who has a BMI within normal limits, obese adults have a markedly increased risk for developing comorbidities such as heart disease, hypertension, type 2 diabetes, osteoarthritis, and certain types of cancer, among others. Especially troubling is the rapid rise in childhood obesity, with the number of children affected more than tripling in the past 30 years. Children and adolescents who are obese are likely to be obese as adults, and as a result will be at a greater risk for developing the comorbidities seen in their adult counterparts. Along with varying exercise prescriptions, dietary intervention is an important component of obesity treatment. Of particular interest are interventions reducing the intake of sugar sweetened beverages. Studies have found that the compensation of liquid calories is less complete than those consumed in solid form and the incomplete compensation of liquid calories may lead to a positive energy balance and subsequent weight gain. Several approaches have achieved some success in the pediatric population in reducing SSB consumption and preventing weight gain. Studies that have been most successful have incorporated classroom based lectures along with activities in which students can actively participate. Methods: Eight teenagers (Age range from 13-17) participated in a month long activity designed to improve knowledge base and awareness of the potential health consequences associated with SSB's. Curriculum was designed using pertinent health facts, concepts, and ideas that have been present in the literature and utilized in other successful interventions. Students were introduced to these concepts via a 30 minute introductory lecture. Students were then tasked with creating an activity (i.e. a "game show" or board game) using the learning objectives (developed by the author and faculty mentor) as a guide for content to include in their own game or activity. Students were required to know and incorporate these learning objectives in the activity. Students met with investigator once per week for the next three weeks to work on projects. The course/activity culminated in an afternoon session where students shared the project they created with fellow Boys and Girls Club members, and had them participate in the games and activities they completed. Outcome measures were knowledge gain and SSB consumption over a week period, and were assessed via a survey developed by the author. SSB consumption survey questions were adopted from the 2010 National Youth Physical Activity and Nutrition Survey (NYPANS), while knowledge questions were tailored toward information

covered by the introductory lecture and learning objectives. Paired t-tests were used to compare pre/post averages in assessment scores and SSB consumption. Results: Initial enrollment in course/activity was eleven students, though only eight completed the month long activity. The participants performed better on questions on the survey pertaining to educational content covered by the learning objectives of the course (67.5% correct on post-course assessment vs 47.5% pre-course, table 1 $p < 0.02$). Participants also saw the average number of SSB's consumed in a week decreased from a pre-course level of 23.75 servings/week vs 19.5 servings/week at the end of the month long course; this finding however, was not significant. Discussion: The introduction of formal educational activities has been shown to reduce SSB consumption and even reduce weight gain. This project demonstrated that educational activities can provide a significant knowledge gain, however a benefit to SSB consumption patterns is less certain. Future projects are needed in this area to obtain more data to better flesh out any potential effect on behavior/consumption patterns in this population

Abstracts

Gilmer Racheal Alissa

Project Title: Is obstetric laceration quality improvement data accurate, and are we meeting 'best practices' in patient care?

Thematic Area: Clinical Research

Abstract: RA Gilmer (BS), JK Corral, R Gibbs, and KJ Hurt. Department of Obstetrics & Gynecology, University of Colorado, Denver CO. Background: In OB/Gyn, third and fourth degree lacerations are a quality benchmark for maternal obstetrical trauma. Incidence of lacerations and performance surrounding care after a laceration occurs is carefully monitored. Through quality improvement initiatives these numbers are strategically reported to maintain awareness and ensure national benchmarks are met. Problematically, billing codes are often used to assess benchmarks, though with the recent shift toward electronic medical records (EMR), the accuracy of laceration reporting may vary. We hypothesize that a physician entered EMR provides more accurate data to guide performance measures than chart abstraction based upon administrative databases or billing codes. Study Objectives: We will determine the accuracy of benchmark obstetric laceration rates by comparing EMR datafields and delivery notes, against morbidity logs, AHRQ reports, and UCD/UPI billing codes. The primary outcome is to determine the true rate of 3rd/4th degree lacerations. Secondary outcomes include: accuracy of other laceration categories (none, 1st/2nd), rate of appropriate medical interventions (antibiotics, early follow up), and complication rates (wound breakdown, infection). Methods: From January through December 2012, usual assessment of laceration data using University Hospital billing codes will be compared with physician-entered EPIC® EMR datafields and OB-Gyn morbidity and mortality lists. Final determination of laceration degree is by expert physician review of entire chart, EPIC data fields, and morbidity logs. All charts with 3rd/4th degree laceration codes will be inspected ($n \approx 75$), as well as a sample ($n = 180$) of charts with 1st/2nd degree codes, and a random selection of charts with no coded laceration ($n \approx 100$). Patient demographics, labor and delivery variables, maternal comorbidities, and postpartum outcome will be recorded and entered in a RedCap database for statistical analysis. Results: Agreement between billing codes and EMR/expert review will be determined. The denominator for benchmark rates will be total spontaneous or operative vaginal deliveries for the study period. Secondary outcomes evaluated included time to follow-up, use of antibiotics, and recommendations regarding stool softeners and sitz baths. Discussion: Quality improvement projects can identify gaps in practice and evaluate performance regarding 'best practices'. In addition to assessing key performance areas regarding after care for third and fourth degree lacerations, our study also evaluates the accuracy of benchmark data collection methods. This is essential for quality reporting internally and for eventual national reporting.

Abstracts

Hamilton Lisa

Project Title: CYP2C19 Drug-Drug Interactions in Emergency Department Patients

Thematic Area: Clinical Research

Abstract: Background: Genetic polymorphisms in CYP450 enzyme expression result in variable rates of drug metabolism among patients. This has important implications for drug effectiveness and safety. A specific CYP450 enzyme, CYP2C19, is used to metabolize approximately 10% of common medications. The prevalence of CYP2C19 polymorphisms in a population of Emergency Department (ED) patients is currently unknown. Objective: The objective of this study is to determine the prevalence of CYP2C19 polymorphisms in an ED population and the percentage of ED patients on CYP2C19-dependent medications. Methods: We conducted a prospective observational study in a large urban academic Emergency Department with 80,000 annual visits. Subjects were included if they had self-reported pain or nausea and were excluded if they were non-English speaking, less than 18 years old, had liver or renal failure, had previously diagnosed chronic pain or cyclic vomiting or were presenting with overdose or altered mental status. Detailed drug ingestion histories for the 48 hours preceding ED visit were obtained. Each drug was coded as: not CYP2C19 dependent, CYP2C19 substrate, CYP2C19 inhibitor or CYP2C19 inducer. Ten percent of patients were then randomized to undergo CYP2C19 genotyping via whole blood assay using the Roche Amplichip. Results: 502 patients were included; 60% were female, 65% were Caucasian, and median age was 39 years (IQR 22, 53). The median number of drugs taken in the 48 hours preceding their ED visit was 3 (IQR 1, 6). A total of 131 patients (26.1%) had taken a CYP2C19 dependent drug during the 48 hours prior to their ED visit. Of these, 30 patients (22.90%) were on a narrow therapeutic index CYP2C19 drug at home. 51 patients (10.1%) were given or prescribed a CYP2C19 drug during their ED visit. 18 of these (3.6%) were among the patients on home CYP2C19 drugs. Only 1 patient on a narrow therapeutic index CYP2C19 drug at home was administered a CYP2C19 drug in the ED. Among 53 patients genotyped, 98% were normal metabolizers and 2% were poor metabolizers. Ultra-rapid polymorphisms were not evaluated. Conclusion: In a population of ED patients presenting with pain or nausea, 26.1% of patients reported taking a CYP2C19 dependent drug in the preceding 48 hours. On genotype analysis, the prevalence of CYP2C19 polymorphisms was rare. We conclude that CYP2C19 genotyping is unlikely to be useful in an ED population, given that the likelihood of a clinically significant CYP2C19 drug-drug interaction in patients presenting with pain or nausea is low.

Abstracts

Mopper Susanna Jennifer

Project Title: Trauma and Emergency Anesthesia Checklist for Denver Health

Thematic Area: Clinical Research

Abstract: Abstract is not yet complete.

Abstracts

Thurman Brooke Elizabeth

Project Title: Characteristics of Perceived Discrimination in Medical Encounters: A report from C-STAHR

Thematic Area: Public Health and Epidemiology

Abstract: This paper explores the characteristics of perceived discrimination in medical encounters as reported by Latino and African American adults. Using principles of Community Based Participatory Research, we conducted three African American (N=20) and three Latino (N=27) focus groups in Denver metro area neighborhoods. Data were analyzed using conventional content analysis and constant comparative method techniques. Five primary themes emerged: provider assumptions based on patient race/ethnicity, lower quality health care delivery, added barriers to the health care visit, poor patient-provider communication/relationship, and dehumanization of the patient. Latinos emphasized provider assumptions about language and added barriers to care while African Americans mentioned assumptions about non-compliance, providers making health problems worse, and feeling treated like a research subject. Both groups mentioned providers assuming participants were poorly educated, not taking health complaints seriously, not giving appropriate services or care, not listening, talking down to patients, and treating participants roughly in the encounter.

Abstracts

Snow Anson

Project Title: Aldose Reductase a Cataract Risk Modifier

Thematic Area: Basic Science

Abstract: Aldose reductase (AR) is thought to play a role in the pathogenesis of diabetic eye diseases, including cataract and retinopathy. However, not all diabetics develop ocular complications. Paradoxically, some diabetics with poor metabolic control appear to be protected against retinopathy, while others with a history of excellent metabolic control develop severe complications. These observations indicate that one or more risk factors may influence the likelihood that an individual with diabetes will develop cataracts and/or retinopathy. We hypothesize that an elevated level of AR gene expression could confer higher risk for development of diabetic eye disease. To investigate this hypothesis, we examined the onset and severity of diabetes-induced cataract in transgenic mice, designated AR-TG, that were either heterozygous or homozygous for the human AR (AKR1B1) transgene construct. AR-TG mice homozygous for the transgene demonstrated a conditional cataract phenotype, whereby they developed lens vacuoles and cataract-associated structural changes only after induction of experimental diabetes; no such changes were observed in AR-TG heterozygotes or nontransgenic mice with or without experimental diabetes induction. We observed that nondiabetic AR-TG mice did not show lens structural changes even though they had lenticular sorbitol levels almost as high as the diabetic AR-TG lenses that showed early signs of cataract. Over-expression of AR led to increases in the ratio of activated to total levels of extracellular signal-regulated kinase (ERK1/2) and c-Jun N-terminal (JNK1/2), which are known to be involved in cell growth and apoptosis respectively. After diabetes induction, AR-TG but not WT controls had decreased levels of phosphorylated as well as total ERK1/2 and JNK1/2 compared to their nondiabetic counterparts. These results indicate that high AR expression in the context of hyperglycemia and insulin deficiency may constitute a risk factor that could predispose the lens to disturbances in signaling through the ERK and JNK pathways and thereby alter the balance of cell growth and apoptosis that is critical to lens transparency and homeostasis

Abstracts

Goebel Maximilian Alexander

Project Title: Case Report. Transitional Cell Metaplasia of a Mesonephric Remnant: A Previously Undescribed Phenomena and Potential Source of Diagnostic Pitfalls

Thematic Area: Clinical Research

Abstract: When conducting a pathological examination of female gynecologic tissue for the presence of HPV-related disease, the pathologist must be aware of the potential for diagnostic pitfalls where neoplastic and benign processes may have a similar appearance. In this report, we present a case of a 51 year old gravida 5 para 4-0-1-4 woman who presented for cervical cone excision for CIN III found on colposcopy and was found to have transitional metaplasia of a mesonephric remnant, a previously undescribed entity in the literature, in addition to confirmed CIN III. While a benign entity, this phenomenon can have a similar diagnostic examination to potential neoplastic or dysplastic processes of both squamous and glandular origin including invasive squamous cell carcinoma, squamous cell carcinoma in situ, mesonephric adenocarcinoma, and cervical gland adenocarcinoma. In differentiating transitional cell metaplasia (TCM) from a squamous dysplastic process, while TCM may appear to lack maturation with ascending cell layers, it does not demonstrate other morphologic characteristics of squamous cell dysplasia, instead having cells with monomorphic nuclei with nuclear longitudinal grooving and zero to few mitotic figures. Moreover, this entity did not show a proliferative glandular pattern, which could raise concern for adenocarcinoma of the cervix. Immunohistochemical staining using p16, PAX2 and bcl-2 can be used to confirm the benign nature of this entity.

Abstracts

Arellano Erik Paublin

Project Title: How can medically underserved communities recruit and retain health care providers who participate in loan repayment programs after service obligation?

Thematic Area: Public Health and Epidemiology

Abstract: Title: How can underserved communities recruit and retain health care providers who participate in loan repayment programs after service obligation? Purpose: To determine what factors influence long-term retention of Colorado loan repayment program participants at their initial service site and community. Background: Uneven geographic distribution of primary care workers is a major problem facing the developed and the developing world. Many communities struggle to attract and retain health care workers in areas of shortage. Colorado and other states utilize loan repayment programs as a tool for attracting and retaining health care providers in health professional shortage areas. Methods: The Colorado Department of Public Health and Environment collects data from loan repayment applicants and providers awarded loan repayment. Loan repayment participant data was collected utilizing the National Health Service Corps Long-term Retention Survey and variables from the Colorado Health Service Corps program application scoring system. A total of 326 individual providers were counted in at least one of the data sources with an overall response rate of 40.0 percent. Colorado Health Service Corps consists of 214 providers and the remaining 112 are National Health Service Corps funded providers. Of all the providers for which there is at least one data point, 55.5 percent (n=181) are currently under contract in the Colorado Health Service Corps program, while 45.5 percent (n=145) are alumni. Results: Of providers participating in loan repayment programs in Colorado, 77.5 percent who have completed their initial contract are still practicing at the same health care site with 40.6 percent of providers anticipating staying one to three years at their same practice site and 34.8 percent of providers anticipating staying four to eight years at the same practice site. Provider characteristics associated with retention at current site or community include desire to work in a specific area or location, formal training with the medically underserved, and a strong sense of belonging to the community. Provider characteristics measured in this evaluation not associated with anticipated retention among selected candidates are: age, gender, race, and living and/or attending college in Colorado. Work factors most strongly associated with long-term (four or more years) and very long-term (9+ years) retention at the same practice site or in the same community include overall satisfaction with the provider's practice site, satisfaction with salary, effective practice administration, satisfactory relationship with practice administration, availability of cross cover/vacation coverage and community-related factors, such as the provider's family's sense of safety in the community. Conclusion: Practices in health professional shortage areas can utilize strategies to retain loan repayment participants by focusing on practice characteristics shown to increase long-term and very long-term retention. Communities may improve retention of providers by

establishing strategies to improve provider sense of belonging in the community and family well-being.

Abstracts

Hamilton Rob

Project Title: Too Much Telemetry?

Thematic Area: Clinical Research

Abstract: While cardiac telemetric monitoring is often used in the inpatient setting to quickly detect clinically significant dysrhythmias, the unnecessarily prolonged use of cardiac telemetric monitoring has been targeted by the Choosing Wisely campaign as a widespread problem that could improve quality of care and the patient experience if addressed at each institution. Using multiple studies, we analyzed the extent of the problem at the University of Colorado Hospital and are attempting to address solutions in a multi-pronged strategy. One showed that over the course of 2 weeks, 209 total patient-days of cardiac telemonitoring were measured, with 69 of those days not meeting our algorithm for appropriately-indicated usage. This translates to 33% of patient-days on telemetry as being non-indicated, costing the institution in the neighborhood of \$1 million annually. Proposed interventions revolve around building a culture that reassesses the use of telemetry in any given patient multiple times throughout each day. These interventions include changing the electronic ordering system; prompting provider review of telemetry orders with the use of reminders on patient doors and during current interdisciplinary rounds; including duration of the order and its clinical indication within the template for daily progress notes, empowering nurses and staff to question managing team when telemonitoring is notably protracted, and educating staff on a consistent basis.

Abstracts

Duran Michael Dean

Project Title: A NEW ANIMAL MODEL FOR DETERMINING THE EFFECTS OF DIABETES ON OSTEOARTHRITIS

Thematic Area: Basic Science

Abstract: A NEW ANIMAL MODEL FOR DETERMINING THE EFFECTS OF DIABETES ON OSTEOARTHRITIS MD Duran (MD), K King PhD, M McNulty (MD), R Clark BS, L Shurm

PURPOSE: Both the prevalence of diabetes and that of osteoarthritis (OA) are high and are increasing rapidly worldwide. Further, age is a significant risk factor for both. A recent publication indicates that within the US Veteran population, rates of total joint replacement (likely due to severe OA) is 1) higher among those with diabetes and 2) occurs at younger ages in those with diabetes. These two points together suggest that diabetes may have the effect of either worsening or accelerating the progression of OA. The purpose of this study was to test the hypothesis that the presence of type 2 diabetes worsens joint disease pathology in an animal model of OA.

METHODS: The destabilization of the medial meniscus (DMM) model of OA was induced in a mouse model of type 2 diabetes. The heterozygous KKAY mouse has polygenetic defects that result in hyperglycemia by eight weeks of age due primarily to insulin resistance. The homozygous wild type KKaa siblings have normal blood sugar levels. Both KKAY and KKaa are overweight to moderately obese. The DMM procedure was performed on 12 week old male KKAY mice (N = 3) and KKaa mice (N = 3). A sham procedure was performed on separate 12 week old male KKAY mice (N = 3). All mice received normal chow diets and had normal cage activity until euthanasia which was 8 weeks post-procedure. Knee joints were obtained, fixed, decalcified, and thin-sectioned. Every third section was stained with safranin O, fast green, and iron hematoxylin. Sections were observed microscopically at low and high magnification for indications of joint degeneration including low or absent safranin O staining, cartilage fibrillation, chondrocyte cloning, early osteophyte formation, and tidemark duplication.

RESULTS: The KKAY mice had significantly greater blood glucose levels (P = 0.007) but not significantly different body masses (P = 0.054) compare to the KKaa at 8 weeks post-procedure (Table). Two of the three KKAY mice had signs of mild OA, one of the three KKaa mice had signs of mild OA, but none of the three sham KKAY mice had signs of OA. The Figure shows one photomicroscopic image from each group illustrating the thin-section with the greatest signs of joint damage.

CONCLUSIONS: The KKAY mice (with control KKaa siblings) are a suitable mouse model of type 2 diabetes for the purpose of testing the effects of diabetes on OA without the presence of confounding factors such as a high fat diet which is commonly required of other models of diabetes. The DMM procedure appears to be successful in the male mice of this strain. However, at 8 weeks post-procedure, signs of joint damage were mild in both groups. Thus, it may be more useful to carry the experiment to 12 weeks post-procedure in order to allow further progression of joint pathology. This should allow a semi-quantitative scoring of joints and allow differences between groups to be distinguished. Table:

Summary of OA prevalence, diabetes and body mass measures.		Group	Mice with mild OA*
Blood Glucose Mean (mg/dL)	Blood Glucose Range (mg/dL)		Body Mass
Mean (g)	Body Mass Range (g)	KKAY (diabetes + DMM) 66%	434 305 – 500+
41.1	38.5 – 43.5	KKaa (control + DMM) 33%	257 222 - 294 36.0
35.6 - 36.7	KKAY (diabetes + sham)	none	457 391 – 500+ 38.2 35.8 –

39.8 *Showing any signs of histological OA: loss of safranin O staining, cartilage fibrillation, surface delamination, chondrocyte cloning. OA = osteoarthritis; DMM = destabilization of the medial meniscus model of OA. Figure: Photomicroscopic images of knee joints from study. From each group, the thin-section illustrating the greatest joint tissue damage is shown. Top row: Section from group with diabetes that received DMM procedure (KKAY + DMM). Middle row: Section from group without diabetes that received DMM procedure (KKaa + DMM). Bottom row: Section from group with diabetes that received sham procedure (KKAY + sham). Left column images of tibial-femoral joint taken at low power (bar = 500 μm). Right column images of medial side taken at high power (bar = 100 μm).

Abstracts

Roberts Joel

Project Title: Colorado Medicaid Children with Autism Waiver and JFK Partners FASL Program Quality Improvement Survey

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: This project aimed to gather common themes and experiences of families that have used the Colorado Medicaid Children with Autism Waiver (CWA) and JFK Partners's FASL program to eventually create a survey evaluating both programs with intent on identifying areas of strength of Andreas for improvement. Families who used FASL provided a convenient study group to look into CWA. An interview template was designed and used to interview 15 families whose responses were recorded, categorized into themes, and reported. These themes can now be used to create a survey to efficiently evaluate parent experiences with the CWA and JFK Partners's FASL in order to continue improving family and patient experiences and providing data to support legislative changes to CWA in the future.

Abstracts

Canastar Mehtap Dogan

Project Title: AFFECT OF CRIZOTINIB ON THE PROTEIN EXPRESSION PROFILE AND ANCHORAGE INDEPENDANT PROLIFERATION OF 3T3 CELLS TRANSFECTED WITH EML4-ALK VARIANTS

Thematic Area: Basic Science

Abstract: AFFECT OF CRIZOTINIB ON THE PROTEIN EXPRESSION PROFILE AND ANCHORAGE INDEPENDANT PROLIFERATION OF 3T3 CELLS TRANSFECTED WITH EML4-ALK VARIANTS. MD Canastar, (M.D., SOM), RC Doebele, Department of Medicine, University of Colorado, Denver, CO. Background: Small subset of non-small cell lung cancer (NSCLC) patients carry an inversion -inv(2)(p21p23)- that results in the fusion gene of echinoderm microtubule-associated protein-like 4 (EML4) and anaplastic lymphoma kinase (ALK). EML4 portion of the fusion protein enables constitutive dimerization and thus deregulated activation of ALK and PI3K-AKT and RAS-MAPK signaling cascades resulting in proliferation of NSCLC cells. Patients with EML4-ALK fusion gene who are being treated with Crizotinib (TKI) show improvement. Inversion of small arm of chromosome 2 can occur at different locations contributing different EML4 fragments to the fusion proteins. Behavior of cells, such as proliferation, drug sensitivity and intracellular signaling events downstream of ALK, harboring different variants has not been investigated in detail, which is the focus of current project. Material and Methods: NIH 3T3 cells transfected with four different EML4-ALK variants were used: exons 6, 13, 18 and 20 (E6;A20, E13;A20, E18;A20 and E20;A20 respectively) of EML4 fuse to exon 20 of Alk in a lentiviral plasmid were introduced into NIH3T3. Puromycin selected cells were assayed for activation of Alk, Erk, Akt, and Stat3 in response to Crizotinib by western blotting. Soft agar assay was performed on NIH 3T3 cells with the different EML4-ALK variants to determine the effect of crizotinib on anchorage independent growth. Results: Western blotting showed that NIH 3T3 cells with the E6;A20 variant had reduced phosphorylated Alk, Erk, Akt and Stat3 in response to Crizotinib, cells with E13;A20 showed Alk and pAlk band at a lower than expected molecular weight. E18;A20 and E20;A20 showed very low levels of Alk. Only detectable affect of Crizotinib treatment on cells with E13, E18, E20 was reduced phosp Stat3 levels. RT-PCR showed no EML4-ALK mRNA for variants E13 and E18. Soft agar assays revealed different anchorage dependant growth in response to Crizotinib. Conclusions: Crizotinib has been showed to be an effective inhibitor of Alk and downstream signaling pathway in NIH 3T3 cells with the variant E6. Crizotinib effect was only detectable in Stat3 levels in cells with variants E13, E18, and E20. Further investigation is necessary to conclude if the low to undetectable levels of Alk in cells with variants E13, E18, E20 is due to ineffective transfection or due to variant effect.

Abstracts

Saccomano Margaret Eloise

Project Title: Utility of CA-125 levels preoperatively as a predictor of optimal surgical cytoreduction and as a predictor of disease recurrence in hereditary BRCA-associated ovarian epithelial carcinoma

Thematic Area: Clinical Research

Abstract: **OBJECTIVE:** The aim of this study was to determine whether pre-operative CA-125 levels could predict the probability of optimal surgical cytoreduction in sporadic and hereditary cases of epithelial ovarian carcinoma. As well it sought to determine if the CA-125 serum levels are significantly elevated at the time of disease recurrence in hereditary (BRCA-associated) cases of epithelial ovarian carcinoma. **BACKGROUND:** CA-125 is a tumor marker often measured preoperatively in the case of ovarian cancer to provide prognostic information about the ability to provide optimal surgical cytoreduction. This has been well studied in the sporadic ovarian cancer population with the large majority of the literature concluding that preoperative CA-125 levels are unable to accurately predict whether or not a patient will receive optimal tumor debulking. However, this information has been less well studied in the hereditary cancer population and conclusions in this regard are much less clear. **METHODS:** We performed an institutional review of medical records for patients with epithelial ovarian carcinoma who received BRCA germline mutation testing and surgical cytoreduction at the University of Colorado Hospital. The following data was extracted: age at time of diagnosis, BMI, BRCA mutation status, preoperative CA-125 level obtained within 4 weeks of surgical cytoreduction, presence or absence of optimal cytoreduction, presence or absence of extensive upper abdominal surgery, presence or absence of recurrence, date of recurrence, method of diagnosis of recurrence, CA-125 level at time of recurrence, time and status of most recent follow up. This protocol has been submitted to the institutional review board at St. Joseph Hospital in order to expand the sample size and is pending approval. **RESULTS:** Presently, no results have been compiled from this study. **CONCLUSION:** The greatest limitation of this study is its lack of power due to a small sample size. Next steps in this process include awaiting approval of the study protocol by the St. Joseph Hospital institutional review board and subsequently extracting data from its patient database. Conclusions will be made once all patient records have been extracted from the two involved hospitals: University of Colorado Hospital and St Joseph Hospital.

Abstracts

Rudolph Michael Robert

Project Title: Community-Students Together Against Healthcare Racism

Thematic Area: Public Health and Epidemiology

Abstract: Community-Students Together Against Healthcare Racism (C-STAGR) is a novel CBPR project in that it is almost entirely student-run. However, inconsistent student schedules and students graduating from their training programs influences students' abilities to effectively participate in the project and requires the training of new students to make the project sustainable. This structure presents unique challenges in maintaining healthy relationships with research partners, establishing clear institutional memory, and training members in CBPR methodology and project-specific policies and procedures. C-STAGR has trained four cohorts of students to date via an inconsistent, ad hoc, method; community members have received little to no formal orientation to the project. The lack of a standardized training curriculum for new members has created inconsistent levels of knowledge and readiness to participate in C-STAGR. We administered a needs assessment survey to current and matriculating members during C-STAGR's most recent ad hoc orientation session to evaluate the current training's effectiveness. Results suggest that the orientation effectively informed all members about C-STAGR. However, deficiencies remain. Members commented on areas where more information is necessary and made recommendations for improvement. Having gathered data about the benefits and shortcomings of current orientation techniques, we make recommendations to improve the curriculum.

Abstracts

Whitsitt Jacob Clark

Project Title: Script Concordance Tests: An assessment tool for medical student's knowledge of diarrheal illness and diabetes

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Script Concordance Testing (SCT) is becoming an increasingly popular tool to assess clinical reasoning skills not adequately assessed using traditional Multiple Choice Question (MCQ) type tests. SCT items ask learners to rank relative impact of new clinical information on previous assumptions. Evaluative scoring of SCT items is done based on baseline data from an expert panel who has answered the same items. The assessment tool contains all necessary scoring sheets, instructor and student guides, and statistical data collected on the SCTs to easily be used by medical educators. We created specifically targeted SCTs for second year medical students in the middle of their endocrine and gastrointestinal system blocks. 142 students completed the diarrhea items and 147 students completed the diabetes items. Reliability among item groups was low (Cronbach's alpha for diarrhea items 0.374 and diabetes items 0.281). Corrected item correlations were generally low (see Item Reliability) and an exploratory factor analysis showed numerous factors. We believe the low correlation scores reflect the fact that these items are assessing clinical reasoning that is content specific.

Abstracts

Gonzales Erin Leigh

Project Title: The effect of curanderismo on chronic non-malignant pain: an observational study

Thematic Area: Clinical Research

Abstract: This observational study aimed to evaluate the effectiveness of curanderismo, an indigenous healing modality combining techniques in massage, sound, and aromatherapy, in relieving chronic pain in patients currently undergoing conventional pain management treatments. Additionally, it attempted to examine the effects of curanderismo on insomnia and depression, two conditions frequently associated with chronic pain¹. Concurrently, the study hoped to shed light on the prevalence and perception of curanderismo among Denver's Hispanic population, and determine if access to alternative health modalities in a conventional medical setting affects patient satisfaction with care. Although this project received Institutional Review Board approval and recruited over 30 patients for treatments, it was ultimately unsuccessful in achieving enough participation to adequately power an analysis of pain reduction. Instead, lessons learned focused on obstacles to recruiting study participants in this underserved, predominantly Hispanic population, and on the importance of education and relationship building in the community health setting.

Abstracts

Sandsmark Emilee Kingston

Project Title: snAPP: Students Novel Approach to Practice Problems

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Background: During the pre-clinical years of medical training, assessment is frequently performed using multiple-choice exams written by faculty instructors. While good evidence indicates that practice testing is a potent predictor of formal exam performance, the efficacy of practice test items written by learners for use by their peers has not been well studied. Our study provides preliminary data on the utility of student-written multiple-choice practice items delivered through a mobile learning application to first-year medical students at the University of Colorado. Methods: During their first year of medical school, six students created over 3,400 multiple-choice study questions. Questions were based on in-class lecture materials and were originally used for self-assessment during exam preparation. After completion of the academic year, students and faculty collaborated to review, revise and publish questions into a mobile application available to incoming students the following year. Finalized questions were organized in correlation to formal learning objectives and were deployed as daily quizzes. Student participation was completely voluntary and formative. De-identified data on practice question usage and academic performance was analyzed and a feedback survey assessed student satisfaction. Results: More than 88% of students utilized practice questions, and the test items themselves performed well (Cronbach's alpha = 0.96, mean question performance = 0.71). In-class exam performance correlated positively with the number of practice items completed ($r = 0.164$, $p = 0.044$, $N = 154$). Student response was quite positive with over 48% of students endorsing continuation of the project as 'extremely important' to their medical education. Conclusion: Student-written multiple-choice questions were widely embraced by learners, and improved classroom performance in a dose dependent manner. These initial findings suggest that practice test items created by students for use by their peers represent a potentially untapped strategy to augment learning and performance during medical training.

Abstracts

Wisniewski Benjamin Lech

Project Title: Test Enhanced Learning Strategies and Deliberate Practice Improves Short-Term Retention of Neonatal Resuscitation Knowledge and Simulation Skills Among Pediatric Residents

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Abstract: Background: Conventional educational models have been shown to be unsuccessful in promoting long-term retention of neonatal resuscitation knowledge and technical skills. Recent medical education literature suggests that knowledge retention can be improved through test enhanced learning strategies and deliberate practice. Objective: To determine whether the use of test enhanced learning strategies and deliberate practice improves the short and long-term retention of neonatal resuscitation knowledge and simulation skills among pediatric residents. Methods: This is a randomized prospective cohort study with pre- and post-intervention educational assessment of neonatal resuscitation knowledge and bag-mask ventilation simulation skills. First-year pediatric residents (N=47) rotating at the University of Colorado Hospital neonatal intensive care unit (NICU) were randomly assigned to one of three intervention groups (Recognition, Recall, and Recall+Practice). Educational groups were defined by testing format and structured deliberate practice sessions. Knowledge and simulation skills were assessed both at the beginning (Pre-Test) and end (Post-Test) of a month-long clinical rotation. Results: A scoring tool was developed and validated using the Delphi method for equipment preparation. At the beginning of their rotation, fewer than 15% of NRP-certified pediatric interns could properly assemble the bag-mask ventilation equipment. The Recall+Practice educational group demonstrated both the highest mean knowledge Post-Test and simulation skill Post-Test score, averaging 8% ($p = 0.03$) and 13% ($p = 0.01$) higher than those of the Recognition group. Conclusion: The use of test enhanced learning strategies in addition to deliberate practice significantly improves short-term retention of both neonatal resuscitation knowledge and simulation skills among pediatric residents. Additional research is needed to understand whether test enhanced learning strategies and deliberate practice can lead to long-term neonatal resuscitation competence. Keywords: Graduate medical education, neonatal resuscitation, bag-mask ventilation, test-enhanced learning, production testing, deliberate practice, simulation-based medical education (SBME).

Abstracts

Byers Joshua Timothy

Project Title: B7-H5 in Pancreas Cancer

Thematic Area: Basic Science

Abstract: Background This study investigated how the B7-H5 protein, a new member of the B7 family, is expressed in normal human pancreas tissues and examined its expression changes in pancreatic cancer. Methods In this analysis, B7-H5 expression was examined by immunohistochemical staining of frozen specimens from patients undergoing pancreatic resection. Results Membranous B7-H5 protein was expressed on normal ductal epithelium within the pancreas. Other cell types from the normal pancreas, such as acinar cells and islet cells, did not express B7-H5. In adenocarcinoma, B7-H5 staining was decreased or absent. Interestingly, B7-H5 expression in intraductal papillary mucinous neoplasms varied with grade. No B7-H5 expression was found with other cancer types such as neuroendocrine tumors, but normal ducts adjacent to tumors were highly positive. Conclusions The findings showed that B7-H5 expression was restricted to ductal cells in the normal pancreas and the expression was downregulated in pancreatic adenocarcinomas. In addition, the findings showed that B7-H5 expression changes within different stages of dysplasia. The study suggests that loss of the B7-H5 signal may contribute to immune evasion of pancreatic adenocarcinoma. However future studies are needed.

Abstracts

Nghiem Nicole

Project Title: Ocular Biocompatibility of Nitinol

Thematic Area: Basic Science

Abstract: Purpose: There is limited research assessing the biocompatibility of nitinol (a nickel-titanium alloy) in ocular tissues. This study aims to evaluate the safety of a minimally invasive nitinol suture developed for use in ocular surgeries by examining its effects on the viability and proliferation of human retinal and corneal cells in vitro. Methods: Cultures of human retinal pigment epithelium (ARPE-19) and human corneal endothelium (HCN E6/E7) were used. First, to establish the levels at which nickel is toxic to these ocular cells, different concentrations of nickel chloride were added to confluent cells and incubated for 3 days. Cell viability was then measured with MTT assay against a control of cells unexposed to nickel. Second, to test for leaching effects, media exposed to nitinol wire for 1, 3 and 8 weeks was incubated with both cell lines for 2 days and cell viability was measured with MTT assay. Media that was incubated for 8 weeks but not exposed to nitinol was used as a control. Third, in order to assess cell growth in the presence of nitinol, cells were seeded onto culture plates containing nitinol wire and examined after growing to confluency. The two-sample t-test was used for statistical analysis. Results: When exposed to various concentrations of nickel chloride, there was a statistically significant decrease in viability for ARPE-19 cells at 2.5 mM ($p=0.01$) and for HCN E6/E7 cells at 0.5 mM ($p=0.002$). The leaching experiments showed no statistically significant decrease in cell viability with exposure to media incubated with nitinol for 1, 3 and 8 weeks for ARPE-19 cells ($p = 0.33, 0.68, 0.54$ respectively) or for HCN E6/E7 cells ($p = 0.48, 0.37, 0.68$ respectively). Cell growth experiments demonstrated that the cells were able to grow to confluency in the presence of the nitinol. Conclusion: The results are promising in establishing the safety of nitinol sutures for use in the eye. Nitinol showed minimal leaching effects and did not appear to affect cell proliferation. Further experimentation is required to examine the long-term effects of nitinol exposure and to determine the absolute level of nickel that may be released from the nitinol wire.

Abstracts

Cole Madeline Lahman

Project Title: Evaluation of a community health worker training program in the Peruvian Amazon through in-depth stakeholder interviews

Thematic Area: Global Health

Abstract: Community Health Workers (CHWs) are an important link between rural river communities and health centers in the Loreto region of Peru. Comunidades Unidas Peru (CUP) is a not for profit organization that trains CHWs in Loreto and facilitates relationships between their communities, local health care centers and the Peruvian Ministry of Health. As part of a program evaluation, CUP performed in-depth stakeholder interviews with CHWs, community members (CMs), health officials and partner NGOs. CUP sought to define current roles of CHWs, local health problems, desired functions of CHWs and suggestions for how to improve CUP's efforts. Rural CMs experienced many maternal-child health problems, infectious diseases, chronic diseases and problems with domestic abuse. Barriers to health included economic and infrastructural barriers as well as lack of trust in the health system. CHWs worked as public health advocates, triage providers and treatment providers; however the amount of time they could spend on CHW duties was limited. Improving CHWs efficacy will require improving internal and external incentives as well as improved supervision.

Abstracts

Shaum Katherine

Project Title: Nutrition and Reproduction: Is there evidence to support a "fertility diet" to improve mitochondrial function?

Thematic Area: Public Health and Epidemiology

Abstract: Normal function of mitochondria plays an essential role in enabling reproductive capacity. To date, few studies have investigated the role of promoting mitochondrial health in relation to fertility in humans. Selected nutritional interventions have demonstrated a potential to enhance mitochondrial function, suggesting a promise for future research for fertility treatment. This review summarizes the extant literature and highlights a putative role of particular nutrients in promotion of mitochondrial function, including in vitro, animal and human studies. Strong basis exists to advocate for further investigation of nutritional treatments for infertility patients.

Abstracts

Do Kevin

Project Title: Comparing Circulating BRAF v600E DNA in Plasma, Serum, and PAXgene

Thematic Area: Basic Science

Abstract: Introduction: Many researchers have been looking at blood as a way to sample tumor DNA, using either plasma or serum as a source. Additionally we wanted to look at PAXgene DNA as a novel source to use, since it can potentially utilize both circulating tumor cell DNA as well as cell-free DNA. We were interested in looking into which of these sources are most sensitive in detecting BRAF V600E mutations, especially in early stage melanoma, to use as a liquid biopsy. Methods: We compared 30 samples from 9 patients with melanoma with known BRAF mutations looking at both DNA concentrations as well as BRAF v600e copies/mL of blood. These samples consist of plasma and serum collected on day 1, as well as serum allowed to sit for four days at 4° C. Six of these patients also had corresponding PAXgene DNA samples. We also compared serum and PAXgene samples at various stages of melanoma. Results: The mean DNA concentrations of the samples are as followed: Plasma: 12.38 ± 4.25 , Serum on Day 1: 21.08 ± 5.56 , Serum on Day 4: 68.28 ± 15.02 , and PAXgene: 198.1 ± 15.21 . The PAXgene samples consistently demonstrated the highest copies/mL of blood, and none of the plasma samples had any BRAF v600E copies detected. Between the serum collected on day 1 or day 2, there is minimal differences in their detection of V600E copies. We also looked at 42 serum and 21 PAXgene samples of known BRAF V600E patients of varying states. 18 of the 21 PAXgene sample demonstrated mutated v600e, compared to only 23 of the 42 serum samples. Conclusion: From our study, it would appear that PAXgene is the most effective source of blood to analyze for quantitative analysis of BRAF v600E. It is the most sensitive in detecting melanoma and could be useful in detecting early disease or treatment response in malignant melanoma.

Abstracts

Ford William

Project Title: Quick Consult—Symptoms: Incidental Skin Finding

Thematic Area: Clinical Research

Abstract: Cutaneous T-cell lymphoma can be an incidental finding in emergency settings. It is important for emergency providers to be able to recognize this disease spectrum in various stages of disease development. This is a brief review of the evidence surrounding cutaneous T-cell lymphoma, specifically mycosis fungoides, designed for an audience of emergency physicians.

Abstracts

Quaine Jennie Hattman

Project Title: Diagnostic Test Process Improvement in the Pre and Post Analytic Phases

Thematic Area: Public Health and Epidemiology

Abstract: The majority of errors in laboratory medicine testing are thought to occur in the pre- and post-analytic testing phases and a large proportion of these errors are secondary to failed hand-offs. As most laboratory tests originate in the ambulatory setting, better understanding of the gaps in hand-off processes within and between laboratories and primary care practices is imperative for patient safety. To explore these processes, the study group conducted a literature review to determine the current state of affairs, then created a survey to assess perceptions of clinic personnel concerning gaps in current practices. Next, a toolkit was created to guide clinics through implementing change in their diagnostic test processes. Finally, the effectiveness of this tool was evaluated. The literature review revealed key error themes in the pre and post-analytic phases of the diagnostic test process. The survey of primary care practices highlighted the lack of standardization and definition of roles in handoffs in primary care laboratory practices for test ordering, monitoring and receiving and reporting test results. The survey also revealed that practice personnel desired practice improvement in the diagnostic test process. The interventions we assisted the practices to develop were well received, but did not systematically result in consistent establishment. Given resource constraints and competing priorities, a toolkit by itself is likely insufficient to yield substantive quality improvements related to laboratory testing processes in primary care clinics. The Toolkit could become a guidebook for practices meeting the requirements of Meaningful Use, as well as the professional requirements for the Maintenance of Certification. These important incentive programs could drive successful efforts toward quality and process improvement in the diagnostic test process.

Abstracts

Norton Dylan LaVallee

Project Title: The accuracy of the death certificate

Thematic Area: Public Health and Epidemiology

Abstract: Importance: Death certificate data form the basis for mortality statistics. Errors in certificate completion threaten the accuracy of these statistics. Reliance on flawed public health statistics may lead to misdirection of public health resources and policies. Objective: To assess the accuracy of death certificate-derived mortality data. Design: Clinical and autopsy records were examined for hospitalized patients. A senior pathologist, blinded to the original cause of death determination, completed a mock death certificate for each case based on clinical history and post-mortem findings. Mock certificates were processed by the National Center for Health Statistics (NCHS) for cause-of-death coding. The original cause-of-death determinations based on the official death certificates for these patients were also obtained from the NCHS. The revised and original causes of death were compared and analyzed for discrepancies. Certificates were examined to see if the original certifying physician was aware an autopsy had been performed and whether autopsy findings were used when completing the death certificate. Setting: A single tertiary care institution in the Denver metropolitan area. Participants: 227 adult patients who died in a natural manner and of medical causes during 2010 and 2011 and for whom an autopsy was performed. All patients who met these criteria were included. Outcomes and Measures: 70% of underlying causes of death changed from one International Classification of Disease (ICD) code to another based on the mock death certificates. In 35% of cases, the change resulted in a shift from one ICD major chapter to another. In only two instances (0.9%) did the certifying physician consult autopsy results and amend the original death certificate based on autopsy findings. Conclusions: These results suggest that public vital statistics mortality data may be profoundly flawed. Measures should be taken to reduce errors in death certification and to improve the quality of vital statistics data.

Abstracts

Howard Ken

Project Title: Intercellular Adhesion Molecule 1 (ICAM-1) Mediates Murine Colon Adenocarcinoma Invasion

Thematic Area: Basic Science

Abstract: Background: Intercellular adhesion molecule-1 (ICAM-1) modulates cell-cell adhesion and is a receptor for cognate ligands on leukocytes. Upregulation of ICAM-1 has been demonstrated in malignant transformation of adenomas and is associated with poor prognosis for many malignancies. ICAM-1 is upregulated on the invasive front of pancreatic metastases and melanomas. These data suggest that the upregulated ICAM-1 expression promotes malignant progression. We hypothesize that the downregulation of ICAM-1 will mitigate tumor progression. Methods: Mouse colon adenocarcinoma cells (MC38) were evaluated for the expression of ICAM-1 using Western immunoblot analysis. Short hairpin RNA (shRNA) transduction was used to downregulate ICAM-1. Tumor invasion determined via a modified Boyden chamber was used as a surrogate of tumor progression examining MC38 cells, MC38 ICAM-1 knockdowns, and MC38 transduced with vehicle control. The cells were cultured in full media for 24 h and serum-starved for 24 h. A total of 5×10^4 cells were plated and allowed to migrate for 24 h using full media with 10% fetal bovine serum as a chemoattractant. Inserts were fixed and stained with crystal violet. Blinded investigators counted the cells using a stereomicroscope. Statistical analysis was performed by analysis of variance with Fisher protected least significant difference and a P value of <0.05 was considered statistically significant. Results: ICAM-1 was constitutively expressed on MC38 cells. Transduction with anti-ICAM-1 shRNA vector downregulated ICAM-1 protein expression by 30% according to the Western blot analysis ($P < 0.03$) and decreased ICAM-1 messenger RNA expression by 70% according to the reverse transcription-polymerase chain reaction. shRNA knockdown cells had a significant reduction in invasion $>45\%$ ($P < 0.03$). There were no significant differences between the invasion rates of MC38 and MC38 vehicle controls. Conclusions: Downregulation of ICAM-1 mitigates MC38 invasion. These data suggest that targeted downregulation of tumor ICAM-1 is a potential therapeutic target.

Abstracts

Collins Victoria Edith

Project Title: A retrospective analysis of incision and drainage versus needle aspiration in the management of breast abscesses.

Thematic Area: Clinical Research

Abstract: **BACKGROUND:** Breast abscess is a condition which causes significant morbidity yet no established guidelines for management exist. In the past, incision and drainage (I/D) has been considered the gold standard. Recently needle aspiration has been hailed as a less costly method of treatment with better cosmesis. However, few studies directly comparing these two treatment modalities exist in the literature, and in particular studies of non-lactational abscesses in a modern US health care system are lacking. **OBJECTIVE:** To compare time to cure of I/D versus needle aspiration in treatment of breast abscesses. **METHODS:** All patients who were diagnosed with a breast abscess at Denver Health Medical Center in 2012 were retrospectively reviewed through electronic medical records. 82 are estimated to be included in the final analysis. Data on patient demographics, method of treatment including antibiotic usage, abscess characteristics, patient comorbidities, and episodes of complication or recurrence are being recorded using secure data collection software. **CONCLUSION:** Data analysis will be completed once final IRB approval is obtained in the coming weeks. We plan to analyze time to cure, duration of antibiotic therapy, and utilization of services by treatment group. We will also examine risk factors for conversion from needle aspiration to I/D.

Abstracts

Drizin Dean Lawrence

Project Title: Improving the Patient Care Handoff Process: A Multi-Disciplinary, Multi-Hospital Quality Improvement Initiative

Thematic Area: Clinical Research

Abstract: The Joint Commission recognizes communication errors as a major contributor to adverse events and transitions of care as a high-risk time for patient care. The Accreditation Council for Graduate Medical Education (ACGME) mandates that transitions of care are structured and monitored. Recent research has shown that implementation of a resident handoff bundle decreased medical errors and preventable adverse events and that peer evaluation of handoffs is feasible. The large size and multi-hospital format of the University of Colorado Internal Medicine Residency Program makes implementation of the previously described handoff bundle impractical without prior evaluation of the current system. This QI initiative aims to rigorously evaluate the current patient care handoff process across the three main hospitals through direct observation, system mapping, and identification of key contributors via fishbone analysis with a plan to implement an adapted evidence based intervention informed by this evaluation and revised upon sequentially linked PDSA cycles.

Abstracts

Best Ryan Nemon

Project Title: Development of an Advisory College Program at the University of Colorado School of Medicine

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: In recent years, there has been an increasing focus on medical student wellness in the United States. At the University Of Colorado School Of Medicine, a student survey in 2012 demonstrated that many students felt burned out, emotionally hardened, down, depressed, or hopeless. As a result, students began to explore ways to correct these perceived problems and approached school administration to began implementation of an advisory college program (ACP). The University of Colorado ACP was designed to fill gaps in current curriculum and to correct deficiencies identified by students. It is now entering its third year of existence and is seeing very positive feedback. It faces numerous challenges, however, as it seeks to evaluate its impact, validate its activities, and to establish itself as a part of the official curriculum. There are many opportunities for the ACP to continue to expand, but there is substantial need to demonstrate that currently targeted goals are being sufficiently met.

Abstracts

Hua Jeremy

Project Title: Cortical Volume Changes Following Testosterone Supplementation in Healthy Older Men

Thematic Area: Clinical Research

Abstract: Men with low levels of endogenous testosterone have been shown to have mild impairments in memory, executive function, visuospatial abilities, and verbal fluency. We hypothesize that cortical volume in the hippocampus, prefrontal cortex (Brodmann area 10), and the temporal-occipital-parietal junction of healthy older men is increased following low-dose testosterone supplementation compared to placebo and usual-dose groups. 32 healthy older men (mean: 64.0 yrs, range: 60-82 yrs) with low-normal testosterone levels (200-350 ng/dl) were randomized into one of three intervention groups: 1) no testosterone supplementation, 2) low-dose (25 mg/day), and 3) usual-dose (50 mg/day). T1-weighted brain MRI was acquired prior to and before the end of the one-year supplementation period. Statistical analyses were performed with a one-way ANOVA. No group differences were observed in the cortical volume change between the pre- versus post-supplementation scans in the regions of interest, however, these results are limited by study-related discrepancies between the testosterone goal levels for each group with the actual levels attained by each subject.

Abstracts

Scott Paul Michael

Project Title: Effectiveness of Implementing a Computerized Clinical Decision Tool on VTE Prophylaxis in Pediatrics: A Retrospective Study

Thematic Area: Clinical Research

Abstract: Pediatric VTE are uncommon, but are associated significant morbidity and mortality and recent studies suggest a dramatic increase in incidence. Identifying risk factors and creating guidelines for VTE prophylaxis has been able to decrease incidence of hospital acquired VTE. But there is a gap between treatment recommendations based on guidelines and actual treatment. The goal of this study was to show that implementing computerized clinical decision support tools compliance with guidelines would increase.

Abstracts

Frank Michael Ryan

Project Title: Tobacco Use Among People Who Have Been in Prison - Relapse and Predictors of Trying to Quit

Thematic Area: Public Health and Epidemiology

Abstract: ABSTRACT Introduction: People who have been in prison have a high prevalence of tobacco use. The majority of these individuals, reflective of the general population, will die of tobacco-related illnesses rather than illicit substance abuse, alcohol use, or traumatic injuries. Despite widespread tobacco-free prison policies, almost all former smokers will relapse on tobacco within days of release from prison. Although social stressors and risky health behaviors are associated with tobacco use in the general population, this relationship has not been studied people recently released from prison. Methods: People recently released from prison (N=143) were interviewed 7 to 21 days after release. Independent variables included social stressors and risky health behaviors, which were characterized by unemployment, housing insecurity, problems with family, spouse, or sexual partner, low educational achievement, risky drinking behavior, recent drug use, and moderate clinical depression. The primary outcome was “trying to quit smoking.” Data was analyzed using Pearson chi-square tests and single and multivariable logistic regression models. Results: Of those who had to quit smoking due to tobacco-free prison policies, 98% reported that they relapsed on tobacco after being released. Trying to quit smoking was associated with the absence of risky drinking behavior in the past 30 days (adjusted odds ratio [AOR] 6.4, 95% confidence interval [CI] 2.0-20.5). Conclusions: The absence of risky drinking behavior and recent drug use is associated with trying to quit smoking among people recently released from prison. Further research may determine whether interventions addressing risky health behaviors, namely risky alcohol use and drug use, can reduce smoking relapse and whether or not integration of tobacco, alcohol, and drug services is optimal for people recently released from prison.

Abstracts

Ngaile Julius

Project Title: HIV/AIDS infection statistics and trends in Kenya, Sub-Saharan Africa; Personal experiences and literature review.

Thematic Area: Global Health

Abstract: Abstract. Since the first case of HIV was diagnosed in 1981, a lot of milestones have been made and knowledge base about HIV has grown significantly. Though no cure is available, the availability of easy diagnostic tests and Highly active Antiretroviral (HAART) has reduced some of the earlier fears about the disease. Despite this achievements, stigma and discrimination about HIV/AIDS still exists. In 1980s, diagnosis of HIV was equated with death sentence. This is has considerably changed since the introduction of HAART, especially in developed countries. Treatment with HAART has proven to be effective in reducing progression to full blown AIDS and reducing HIV transmission. Though Sub-Saharan Africa bears the most burden of HIV/AIDS, availability of HAART is still limited. Initially, prevalence and incidence rate of HIV/AIDS were increasing in late 80's and early 90's followed by overall global decline, a trend that continues today in most regions with other regions having stable rates. After spending six weeks in Kenya in summer of 2012 working at a health facility in Kitui county, I witnessed firsthand the delivery of HIV/AIDS health care services and got interested in finding out the current HIV/AIDS statistics in the country. I reviewed literature about HIV/AIDS in Kenya. The aim of this literature review is to elucidate the recent statistics and trends of HIV/AIDS in the Kenya in the recent years. This paper explores the geographical variations in incidence and prevalence. Current factors hindering access to HIV/AIDS care are also examined. I systematically searched and reviewed different recent journal articles about this topic. PubMed and Medscape were the major source of the articles.

Abstracts

Percy Samuel

Project Title: There's No Place Like Home: A Retrospective Examination of the Correlation between Socioeconomic Factors, Home Address, and Incident Address in Patients Presenting to Tygerberg Hospital Following Penetrating Trauma

Thematic Area: Global Health

Abstract: Background: Injury is a major public health issue in low and medium income countries. South Africa is a medium income country with a disproportionately high burden of trauma and violence. Violence and injury are the second leading cause of death and lost disability-adjusted life years, only after HIV/AIDS, in South Africa. Injury data is often scarce and inaccurate in low-resource settings. A better understanding of injury data can lead to improved preventative measures and a better understanding of geographic location of injury and the relationship between violence and socioeconomic factors are needed to guide these measures. Objective: To identify and map penetrating trauma “hot spots” in Cape Town, South Africa. To use socioeconomic data from the 2011 census to identify which socioeconomic factors correlate to these “hot spots. To use geographic statistical analysis to allow for targeted placement of injury prevention efforts based on correlation. Setting and Design: A retrospective chart review of 911 patients presenting with penetrating thoracic trauma to Tygerberg Hospital, a Level 1 trauma center serving the Western Cape Province in Cape Town, South Africa. A geographic information system was used to map patient home mainplace, incident location and socioeconomic data (adult education, dwelling type, employment, house income, population by age, and population by race) from the 2011 census. Statistical analysis will be performed to identify which socioeconomic factors correlated with penetrating trauma “hot spots”. Results: Nine-hundred and eleven patients fit inclusion criteria. Home subdivision was collected for 785 patients (86%) and incident subdivision was collected for 747 (82%) patients. The home subdivisions Kraaifontein (126; 16%), Delft (106; 13.5%), and Khayelitsha (99; 12.6%) accounted for more than 42% of the total number of penetrating trauma incidences. The highest rate of injury per 10,000 people occurred in the home subdivisions of Koelenhof, Macassar and Fisantekraal (66.2, 14.4, and 13.7, respectively). The highest absolute number of injuries according to incident mainplace were found in Delft (215; 28.8%), Khayelitsha (149; 19.9%), and Kraaifontein (133; 17.8%) with the rate of injury per 10,000 people highest in Elsies Rivier (26.8), Delft (14.1) and Kraaifontein (8.5). The home and incident mainplaces were plotted using ArcGIS. Visual inspection reveals clustering of the home mainplace data in the Eastern half of the Cape Metropole. Visual inspection reveals incident mainplaces seem to be more tightly grouped. ArcGIS will be used to identify statistically significant spatial clusters. Race, low education level, high unemployment, and high percentage informal dwelling appears to correlate with high rates of penetrating trauma. A grouping analysis of the census data will be performed to identify mainplaces with significantly higher or lower percentages of demographic

or socioeconomic features. Conclusion: Socioeconomic factors play a role in both the types of patients who are victims of penetrating trauma and where episodes of penetrating trauma occur.

Abstracts

Grant Matthew

Project Title: Improvement of Door-to-Groin Puncture Time for Endovascular Therapy in Acute Ischemic Stroke Using Quality Improvement Methods

Thematic Area: Clinical Research

Abstract: Abstract: Title: Improvement of Door-to-Groin Puncture Time for Endovascular Therapy in Acute Ischemic Stroke Using Quality Improvement Methods Background and Objectives: Time has been identified as a key variable to the success endovascular treatment of acute ischemic stroke. This project was designed to reduce the time from patient arrival to groin puncture for these treatments at the University of Colorado Hospital. Methods: Using Plan-Do-Study-Act (PDSA) quality improvement (QI) methodology, a multidisciplinary team was created to identify ways to reduce time from patient presentation to groin puncture. A comparison of pre-intervention and post-intervention times was performed. Pre-intervention patients were retrospectively identified using existing databases and post-intervention patients were prospectively identified. Process maps were created to identify areas of delay. Four PDSA cycles were subsequently completed. Interventions employed include: 1) determining the criteria for an early call to neurointerventional radiology (NIR); 2) prepping the patient by Emergency Department (ED) staff; 3) standardizing the consent and other processes; 4) use of time logs for record keeping; 5) improving communication with wifi phones and phone number consolidation; and 6) establishing regular debriefs to identify future process improvements. Conclusions: The median time from presentation to groin puncture was reduced from 133 minutes to 104 minutes. Daytime cases were reduced from 133 to 90 minute medians. MRI imaging was associated with a long pre-intervention time to groin puncture, with a median of 182 minutes that was reduced to 115 minutes. Afterhours procedures were associated with long time to groin puncture, with a median time of 198 minutes that was reduced to 129 minutes. This study thereby demonstrated that a reduction of time from presentation to groin puncture is possible using systematic evaluation of institutional-specific workflow and PDSA cycles.

Abstracts

Posada Jessica Marie

Project Title: Broad-spectrum therapeutic suppression of metastatic melanoma through nuclear hormone receptor activation

Thematic Area: Basic Science

Abstract: Melanoma metastasis is a devastating outcome lacking an effective preventative therapeutic. We provide pharmacologic, molecular, and genetic evidence establishing liver-X nuclear hormone receptor (LXR) as a therapeutic target in melanoma. Oral administration of LXR agonists suppressed melanoma invasion, angiogenesis, tumor progression, and metastasis. Molecular experiments revealed these effects to be mediated by LXR β , which elicits these outcomes through transcriptional induction of apolipoprotein-E (ApoE). LXR β targeting prolonged animal survival and suppressed the progression of established metastases. Importantly, LXR β activation displayed melanoma-suppressive cooperativity with the frontline regimens dacarbazine, B-Raf inhibition, and the anti-CTLA-4 antibody and robustly inhibited melanomas that had acquired resistance to B-Raf inhibition or dacarbazine. We present a promising therapeutic approach that uniquely acts by transcriptionally activating a metastasis suppressor gene.

Abstracts

Mackin Anna Gennadyevna

Project Title: The Relationship Between Mid-Treatment PSA and Biochemical Outcome in Prostate Cancer Patients Undergoing Salvage Radiotherapy.

Thematic Area: Clinical Research

Abstract: Purpose: To study the relationship between mid-treatment PSA and biochemical outcome after salvage radiotherapy (SRT) in prostate cancer patients at our institution. Methods: Retrospective review of prostate cancer patients undergoing SRT in 2004-2010, with prospectively collected pre-, mid- and post-SRT PSA. Results: Biochemical failure after SRT was noted in 13/27 males (48.1%). SRT-responders experienced a greater decline in mid-SRT PSA as compared to non-responders ($p=0.0582$). Patient age, radiation dose, Gleason score, concurrent ADT or pre-SRT PSA did not show significant association with SRT response. Patients with decline in mid-SRT PSA experienced significantly longer mean time to biochemical failure (53.9 months (SE 10.6) vs 1.9 months (SE 0.5); $p=0.0062$), and had a 96.9% lower risk of biochemical failure immediately upon completion of SRT (95% CI (47.2%, 99.8%), $p=0.0163$), compared to patients with no decline in mid-SRT PSA. Conclusion: Decline in mid-SRT PSA may predict a favorable SRT response.

Abstracts

Field Carlie

Project Title: There's No Place Like Home: A Retrospective Examination of the Correlation between Socioeconomic Factors, Home Address, and Incident Address in Patients Presenting to Tygerberg Hospital Following Penetrating Trauma

Thematic Area: Global Health

Abstract: Background: Injury is a major public health issue in low and medium income countries. South Africa is a medium income country with a disproportionately high burden of trauma and violence. Violence and injury are the second leading cause of death and lost disability-adjusted life years, only after HIV/AIDS, in South Africa. Injury data is often scarce and inaccurate in low-resource settings. A better understanding of injury data can lead to improved preventative measures and a better understanding of geographic location of injury and the relationship between violence and socioeconomic factors are needed to guide these measures. Objective: To identify and map penetrating trauma “hot spots” in Cape Town, South Africa. To use socioeconomic data from the 2011 census to identify which socioeconomic factors correlate to these “hot spots. To use geographic statistical analysis to allow for targeted placement of injury prevention efforts based on correlation. Setting and Design: A retrospective chart review of 911 patients presenting with penetrating thoracic trauma to Tygerberg Hospital, a Level 1 trauma center serving the Western Cape Province in Cape Town, South Africa. A geographic information system was used to map patient home mainplace, incident location and socioeconomic data (adult education, dwelling type, employment, house income, population by age, and population by race) from the 2011 census. Statistical analysis will be performed to identify which socioeconomic factors correlated with penetrating trauma “hot spots”. Results: Nine-hundred and eleven patients fit inclusion criteria. Home subdivision was collected for 785 patients (86%) and incident subdivision was collected for 747 (82%) patients. The home subdivisions Kraaifontein (126; 16%), Delft (106; 13.5%), and Khayelitsha (99; 12.6%) accounted for more than 42% of the total number of penetrating trauma incidences. The highest rate of injury per 10,000 people occurred in the home subdivisions of Koelenhof, Macassar and Fisantekraal (66.2, 14.4, and 13.7, respectively). The highest absolute number of injuries according to incident mainplace were found in Delft (215; 28.8%), Khayelitsha (149; 19.9%), and Kraaifontein (133; 17.8%) with the rate of injury per 10,000 people highest in Elsies Rivier (26.8), Delft (14.1) and Kraaifontein (8.5). The home and incident mainplaces were plotted using ArcGIS. Visual inspection reveals clustering of the home mainplace data in the Eastern half of the Cape Metropole. Visual inspection reveals incident mainplaces seem to be more tightly grouped. ArcGIS will be used to identify statistically significant spatial clusters. Race, low education level, high unemployment, and high percentage informal dwelling appears to correlate with high rates of penetrating trauma. A grouping analysis of the census data will be performed to identify mainplaces with significantly higher or lower percentages of demographic

or socioeconomic features. Conclusion: Socioeconomic factors play a role in both the types of patients who are victims of penetrating trauma and where episodes of penetrating trauma occur.

Abstracts

Thomson Rebecca Elizabeth

Project Title: Assessing Healthcare Providers' Knowledge of Culturally Appropriate Nutrition for Hispanic Patients

Thematic Area: Clinical Research

Abstract: The top cause of morbidity and mortality in the Denver Hispanic and Latino population is cardiovascular disease. Although progression of cardiovascular disease is has been linked to dietary and nutritional habits, many area providers feel less confident in assessing the nutritional status of and making specific dietary recommendations to these patients than their Caucasian counterparts. In this study, area providers were surveyed to assess their comfort level in addressing these topics with Hispanic patients and baseline knowledge of the typical Hispanic diet and its healthfulness. Overall, our results suggest that providers feel that they do need to approach nutrition counseling differently with their Hispanic versus non-Hispanic patients, use traditional ethnic foods in their dietary counseling but feel generally ill equipped to do so. We have identified shortcomings of our training in culturally effective medicine, especially with regard to healthfulness of traditional foods and have found opportunities to further educate healthcare providers in these areas.

Abstracts

Minot Patrick Ryan

Project Title: 5 year trends in multimedia patient education: lessons learned and implications for multimedia web forum development

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Title: 5 year trends in multimedia patient education: lessons learned and implications for multimedia web-forum development Background: Increasing patient knowledge about health and disease may promote wellness and increase patient engagement in healthcare. Traditional modes of information exchange between providers and patients, however, result in insufficient knowledge gains particularly in patients with lower health literacy. Advancements in technology including the use of multimedia in patient education may offer new avenues for promoting health. Objectives: The aim of the present study is to review experimental studies in the existing literature which compare the efficacy of multimedia in patient education, to other educational mediums. Outcomes of interest include the impact of multimedia on patient knowledge, knowledge retention, anxiety, self efficacy, communication, patient led clinical decision making, and clinical outcomes. Methodology: A systematic literature search of Medline (ovid) 2009 to December 2014 was performed. Conclusions: Multimedia may be a useful adjunct to standard of care patient education. In comparison to verbal or printed education multimedia may lead to reduced patient anxiety, better clinical outcomes, and increased knowledge acquisition, self efficacy, communication, and clinical decision making. Conclusions, however, may be limited by the heterogeneity of multimedia interventions, and continued research is needed to evaluate the effects of different types of multimedia in different clinical environments.

Abstracts

Kennel Christopher Elmer

Project Title: Nonconvulsive Status Epilepticus Masquerading As Stroke

Thematic Area: Clinical Research

Abstract: This case describes a patient with multiple stroke risk factors—including prior stroke—who presented to the emergency department with symptoms suggestive of stroke and who received a rapid stroke work up but was later found to be in nonconvulsive status epilepticus (NCSE). This case report highlights the challenge and importance of making an accurate diagnosis in NCSE, and we have included teaching points to help clinicians understand the clinical manifestations and diagnosis of NCSE as well as how it may impact a patient's prognosis. Given the growing attention to rapid stroke protocols in emergency departments across the country, it is important to remember that not all that appears as stroke is stroke, even in people who are at high risk for stroke or in whom stroke is the most likely cause of their neurologic deficits.

Abstracts

Pfaffly Jason

Project Title: NEW REGULATIONS, NEW BUSINESS ENVIRONMENT: HOW TO REMAIN INDEPENDENT AND COMPETITIVE IN RURAL PRIMARY CARE?

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Current medical students and residents are training to enter an industry that is so much in flux that it is unlikely the practice modalities we are training under will be operating the same by the time we enter practice on our own. The current project is the beginning of an attempt to define a path for those interested in rural private practice to remain independent, successful, and in control of our own profession, in such an uncertain industry. This document contains a detailed literature review, information and commentary from personal interviews of experts in their particular domains, along with analysis of the findings. The ultimate goal of this work is aimed at providing the information and understanding necessary for developing a business model for a rural primary care private practice that is crafted specifically for weathering the storms most likely to affect the health care industry in the next decade.

Abstracts

McCartney Suzanne

Project Title: Developing a culture of quantitative data collection to enable quality improvement projects for the Healthy Beginnings Clinic at Warren Village

Thematic Area: Public Health and Epidemiology

Abstract: Background: Medical student-run free clinics fill a void within the medically underserved populations nationwide. The experience medical students gain via volunteering at these clinics also provides a necessary initiation to becoming providers within the systems-based healthcare system. Though there are many student-run clinics at medical schools throughout the US, there is little literature on how they are run. Furthermore, there is even less literature on how to assess the clinic populations' needs and how best to address them. Healthy Beginnings Clinic is a student-run free pediatric clinic for the residents of Warren Village, a non-profit providing housing services to single parent families. Many of the residents at Warren Village are new immigrants to the US and often do not yet have a primary care pediatrician. Healthy Beginnings Clinic strives to provide a starting off point for these families, via free health care, vaccines, and assistance in finding a primary care provider. Though this clinic was started 16 years ago, there has never been an assessment of what the main needs are of the population, and if the clinic is meeting those needs. Methods: A primary survey was created to assess how easily or disruptive a new data collection tool could be integrated into the current clinic flow, as well as how many responses would be gathered from the patrons. A second survey focusing on integral questions about not only how the clinic is currently providing care, but also how it could better serve its population has been created. This later survey will also collect data about the volunteers at the clinic and their educational experience. Data from this later survey will be assessed at the end of each semester starting after integration of the follow-up study. All data will be de-identified and stored in a secure, web-based server through the University of Colorado, entitled REDCap. Results: The initial results were gathered over 10 weeks at the Healthy Beginnings clinic. Of these 10 clinic nights, patients were missing the newly introduced questionnaires from three clinic nights showing that 70% of the clinic nights had successful and complete data collection. The preliminary results in assessing the rate of data collection showed that 78% percent (33 of 42) of the total patients seen during the 10 clinic visits since the new tool was introduced had completed the questionnaire. Conclusions: The results above provided crucial data as to how effective the implementation of a survey within the current clinic process will be. These reassuring findings add support to the implementation of a more extensive survey into the clinic's protocols. The data from this new survey will be pooled at the end of each semester and reported back to the student clinic managers. System-based changes reflecting these data implemented into the following semesters clinics. Hopefully within one year of integration of this data collection, Healthy Beginnings Clinic will have instituted new policies providing better and more appropriate care to its patrons.

Abstracts

Menachof Kelly Katherine

Project Title: Efficacy of a Mer and Flt3 tyrosine kinase small molecule inhibitor, UNC1666, in acute myeloid leukemia

Thematic Area: Basic Science

Abstract: Mer and Flt3 receptor tyrosine kinases have been implicated as therapeutic targets in acute myeloid leukemia (AML). In this manuscript we describe UNC1666, a novel ATP-competitive small molecule tyrosine kinase inhibitor, which potently diminishes Mer and Flt3 phosphorylation in AML. Treatment with UNC1666 mediated biochemical and functional effects in AML cell lines expressing Mer or Flt3 internal tandem duplication (ITD), including decreased phosphorylation of Mer, Flt3 and downstream effectors Stat, Akt and Erk, induction of apoptosis in up to 98% of cells, and reduction of colony formation by greater than 90%, compared to treatment with vehicle. These effects were dose dependent, with inhibition of downstream signaling and functional effects correlating with the degree of Mer or Flt3 kinase inhibition. Treatment of primary AML patient samples expressing Mer and/or Flt3-ITD with UNC1666 also inhibited Mer and Flt3 intracellular signaling, induced apoptosis, and inhibited colony formation. In summary, UNC1666 is a novel potent small molecule tyrosine kinase inhibitor that decreases oncogenic signaling and myeloblast survival, thereby validating dual Mer/Flt3 inhibition as an attractive treatment strategy for AML.

Abstracts

Chan Michael

Project Title: Reefer Madness: Marijuana and Medical Education

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Little is known about the health effects of marijuana use, & little consensus exists amongst physicians regarding appropriate uses. We distributed an anonymous online survey to medical students at the University of Colorado. Items included personal & professional opinions, experiences with, & attitudes toward marijuana use. We received 236 responses (RR=37.8%). Students indicated support for marijuana legalization & believed physicians should be able to recommend marijuana to a patient without penalization. A minority believed that medical school curriculum adequately addressed the risks/benefits of marijuana use in the preclinical or clinical setting, or that clinical preceptors possessed adequate knowledge. 20% indicated they had seen unprofessional behavior towards patients due to marijuana use. Nearly all students believed marijuana could play a role in the treatment of medical conditions & supported further research. Medical students support marijuana legal reform & increased research. However, they are not confident in medical education as it pertains to marijuana, with specific concern for instructor knowledge & professionalism.

Abstracts

Shah Monil Rajesh

Project Title: Checkpoint kinase 1 expression is an adverse prognostic marker and therapeutic target in Myc driven medulloblastoma

Thematic Area: Basic Science

Abstract: Medulloblastoma is the most common malignant brain tumor in children and remains a therapeutic challenge. Using integrated genomics we recently demonstrated that multiple cell cycle checkpoint kinases are critical regulators of Myc driven medulloblastoma. Among these was Checkpoint kinase 1 (CHK1). Activation of CHK1 pathway promotes treatment resistance in tumor cells. Recent studies suggest that targeting CHK1 with a small molecule inhibitor, to sensitize tumors to DNA-damaging agents, is a promising approach to tumor therapy. We hypothesized that CHK1 would be an enticing therapeutic target in Medulloblastoma. Analysis of gene and protein expression revealed that CHK1 mRNA and protein levels are over expressed in all medulloblastoma patient samples and in cell lines when compared to normal pediatric cerebellum. Elevated CHK1 expression correlated with adverse survival outcomes in a large cohort of medulloblastoma patients. Inhibition of CHK1 by a low nanomolar concentration of a CHK1 inhibitor, AZD7762 potently inhibited medulloblastoma cell growth, suppressed the colony-forming ability, and increased cellular apoptosis. Furthermore, AZD7762 pretreatment sensitized medulloblastoma cells to cisplatin. This study demonstrates that CHK1 expression is a prognostic marker in medulloblastoma and targeting CHK1 is an attractive strategy that warrants further investigation.

Abstracts

Finn Erin Elizabeth

Project Title: Local and Systemic Humoral Responses to *Cryptococcus neoformans* in Cerebrospinal Fluid and Blood with HIV-1-associated Cryptococcal Meningitis

Thematic Area: Basic Science

Abstract: Antibodies may support protection against cryptococcal meningitis (CM), a prominent cause of disease and death in patients with advanced HIV-1 infection, among whom B cell and antibody defects are common. We measured levels of total and cryptococcal capsular glucuronoxylomannan (GXM)-specific IgG and IgM by ELISA in serum and cerebrospinal fluid (CSF) from 41 subjects co-infected with *Cryptococcus neoformans* and HIV-1 (median 13 CD4+ T cells/ μ L) in Kampala, Uganda at the time of meningitis diagnosis. Immune complexes (IC) were acid-dissociated. Antibody specificity was determined by cross-absorption with GXM and heterologous antigens and avidities with ammonium thiocyanate dissociation. GXM-IgG was more frequently detected in CSF than GXM-IgM (97% and 28% of subjects, respectively). Both levels and avidity of GXM-IgG in CSF, but not GXM-IgM, increased significantly upon IC dissociation. Levels of GXM-IgG and GXM-IgM were not associated with levels of CSF inflammation, antigen titer, or 30-day mortality (14 of 41 [34%]). Paired sera (n=5) and CSF (n=8) samples from patients prior to and at the time of development of immune reconstitution inflammatory syndrome (IRIS) showed no evidence of increased GXM-specific IgG or IgM. In conclusion, GXM-specific antibodies, particularly IgG, were present in the CSF of virtually all patients with HIV-1 and CM co-infection, the most avid of which bound circulating antigen. Enhancing levels and function of such antibodies may support opsonization of *C. neoformans*, promote cytokine production and cellular immune responses to the organism to facilitate protection against these common and often fatal infections.

Abstracts

Ansbaugh Nathan

Project Title: Critical Evidence Appraisal Elective

Thematic Area: Public Health and Epidemiology

Abstract: INTRODUCTION AND OBJECTIVES: Nationwide, the incorporation of public health principles and skills in critical evidence appraisal are often insufficient in medical school curricula. To address this issue, an elective course was designed at the University of Colorado to supplement the epidemiology/biostatistics curriculum that is currently built into the medical school education to focus on principles that allow evaluation of associations between exposures and outcomes through the use of critical evidence review methods of the published literature. The purpose of this study was to examine the effects of this unique elective curriculum on participants' confidence in their ability to apply epidemiology concepts to their clinical practice, perceived level of competence with basic principles in epidemiology and biostatistics, and to improve experience in conducting literature review. METHODS: An elective curriculum focusing on critical evidence appraisal was designed and run from January through February of 2013. Anonymous pre/post course surveys were written with three objective questions using Likert scoring to evaluate the participants' perceived confidence in the application of epidemiology in the clinical setting, competence with principles in biostatistics and epidemiology, and level of experience conducting literature review. Basic statistical analysis of these questions using two-sample T-tests of equal variances to compare group mean pre-post course scores for the three separate questions. Secondary outcomes involved subjective data collection to evaluate reasons for student participation in the course and to guide future course improvement. RESULTS: Of the 11 students that initially enrolled in the course and completed the pre-course survey in its entirety, 10 students completed to full course curriculum with passing scores and completed the post-course survey. Following completion of the course, the level of confidence in applying epidemiology principles to clinical medicine increased significantly from an average score of 2.9 to 3.6 out of 5 possible points ($p < 0.01$), which correlated to the majority of the students reporting feeling mostly confident in this area. "Good" competence with basic principles of epidemiology and biostatistics was reported by 60% of students after the course compared to only 27% prior to the course, with mean scores improving from 3.1 to 3.6 out of 5 possible points ($p = 0.08$). No change in mean or statistical change was reported in the students' reports of level of experience conducting literature review. CONCLUSIONS: Given the opportunity to improve upon foundational knowledge in biostatistics and epidemiology as it relates to critical evidence appraisal and clinical decision making, medical students will not only commit to participating in this opportunity but report significant benefits in their ability to apply these public health concepts clinically as well as they report feeling more competent in their interpretation of principles of epidemiology and biostatistics in the literature. Offering elective opportunities to students may increase the number

of physician role models who are capable of using these public health principles in their clinical practice.

Abstracts

Bailey Joshua Farber

Project Title: Developing a Standardized Curriculum for New Members

Thematic Area: Public Health and Epidemiology

Abstract: Community-Students Together Against Healthcare Racism (C-STAHR) is a novel CBPR project in that it is almost entirely student-run. However, inconsistent student schedules and students graduating from their training programs influences students' abilities to effectively participate in the project and requires the training of new students to make the project sustainable. This structure presents unique challenges in maintaining healthy relationships with research partners, establishing clear institutional memory, and training members in CBPR methodology and project-specific policies and procedures. C-STAHR has trained four cohorts of students to date via an inconsistent, d hoc, method; community members have received little to no formal orientation to the project. The lack of a standardized training curriculum for new members has created inconsistent levels of knowledge and readiness to participate in C-STAHR. We administered a needs assessment survey to current and matriculating members during C-STAHR's most recent d hoc orientation session to evaluate the current training's effectiveness. Results suggest that the orientation effectively informed all members about C-STAHR. However, deficiencies remain. Members commented on areas where more information is necessary and made recommendations for improvement. Having gathered data about the benefits and shortcomings of current orientation techniques, we make recommendations to improve the curriculum.

Abstracts

Miller Matthew Wayne

Project Title: Sociolegal Need in Hospital-Based Clinic and Emergency Department Settings

Thematic Area: Public Health and Epidemiology

Abstract: Background: There are significant disparities in health across racial, ethnic and socioeconomic lines. While many of the factors contributing to disparities are well-known, little is known about the role of unmet legal needs. Anecdotal reports suggest that patients in underserved communities often have legal problems that affect their health. Objectives: To measure the prevalence of legal needs, and whether legal needs were associated with demographic characteristics, poor health, non-English language preference or other factors in the patient population at a hospital-based Emergency Department (ED). Methods: Over a 1-week period, a 29-item written survey (English and Spanish) was offered to families in the waiting room at the University of Colorado Hospital ED. Questions addressed demographics, health status and language preference. Patients were asked if they had experienced any of 13 legal problems in the past 12 months, grouped according to the National Center for Medical-Legal Partnerships' classification system (income, insurance, housing, education, employment, legal status, family safety). Patients were asked about access to legal services and the effects of legal problems on their health. Survey responses were summarized using proportions and 95CIs; ORs and 95CIs were used to test for associations between patient characteristics and legal needs. Results: Surveys were collected from 325 patients. Most responded in English (90%) and were < age 40 (61%), female (60%) and non-Hispanic (69%). Significant proportions never graduated from high school (17%), earned < \$15,000 annually (41%), reported at least one chronic medical condition (43%) and listed their health as only "fair" or "poor" (30%). Overall, 64% (59-70%) reported at least one legal problem in the past 12 months. Of these, 33% (26-39%) stated that their legal problem(s) had an adverse impact on their health; 89% (84-93%) had no access to legal services. Legal problems were associated with annual income less than \$25,000 (OR 2.17, 95CI 1.32-3.57), unemployment (2.29, 1.34-3.91) and unstable housing (3.76, 1.28-11.05). Conclusions: In this ED survey, unmet legal needs were common and may be associated with adverse health outcomes. Additional studies are needed to ascertain the impact of screening for legal need, and of medical-legal partnerships on health outcomes.

Abstracts

Ozzello Daniel James

Project Title: Cost Concerns and Evidence-Based Medicine: Factors Affecting Therapeutic Decisions in Uveitis

Thematic Area: Clinical Research

Abstract: **PURPOSE:** To evaluate whether cost, insurance prior authorization, pregnancy considerations and subspecialty practice lead to changes in therapeutic decisions among uveitis and retina specialists in the treatment of intermediate and posterior uveitis. **DESIGN:** Prospective cross-sectional study **METHODS:** 934 uveitis and retina specialists across the United States were surveyed via email regarding their choice in long-term therapy for three hypothetical patients with uveitic conditions (Behcet's disease, birdshot retinochoroiditis, and intermediate uveitis). Respondents were asked to select first and second choice therapies and then re-select first and second choices assuming cost of all options was equal to the patient and there would be no issues with insurance prior authorization. In one case, they were additionally asked for their treatment preferences if the patient desired a pregnancy. Outcomes of interest were differences in therapy choice based on cost/prior authorization, pregnancy, and subspecialty practice. **RESULTS:** One hundred and six respondents (11.3%) completed the survey; forty-four were uveitis specialists and sixty-two retina specialists. Cost and prior authorization affected the therapy choices of uveitis specialists treating ocular Behcet's disease ($p=0.008$). Uveitis specialists and retina specialists differed in their first choice in therapy for each vignette when cost and prior authorization were equalized ($p=0.0018$, 0.0049 , and 0.0156). Both uveitis specialists and retina specialists changed their therapeutic choices for intermediate uveitis when pregnancy was a consideration ($p=0.00001$ for uveitis specialists, $p=0.0044$ for retina specialists). **CONCLUSIONS:** Physician decision-making in intermediate and posterior uveitis is affected by cost and prior authorization concerns, pregnancy considerations and subspecialty practice.

Abstracts

Gebhard Grant MacKnight

Project Title: The effect of physician counseling techniques on patient education and motivation to change unhealthy behaviors

Thematic Area: Clinical Research

Abstract: Objective. This study is designed to examine types of counseling given during patient encounters and to determine whether or not physician counseling has an effect on patients' desire to change unhealthy behaviors. Method. Data was gathered using a pre-visit and a post-visit survey. Surveys were linked using a randomly-assigned identification number. T-tests assessed the statistical significance of pre-post survey differences for desire to change lifestyle habits and perception of lifestyle behavior effects on overall health. Results. There were 90 participants that completed the pre-visit survey and 64 that completed the post visit survey. Average participant age was 43.8 years, 74% were women, 20% were African American, 67% were overweight or obese, and 13% were current smokers. 24 post-survey participants reported lifestyle counseling during their physician visit. There were no appreciable differences between counseling and non-counseling groups when analyzing desire to change unhealthy behaviors and perception of unhealthy behaviors on overall health. Conclusions. This study failed to find a statistically significant difference in patient's desire to change unhealthy lifestyle behaviors between groups that did and did not receive lifestyle counseling. Data from the pre-visit surveys suggests that most patients with unhealthy behaviors are aware of the effect of these behaviors on their overall health and the majority of patients indicate that they have made attempts to rectify unhealthy behaviors in the month prior to their physician visit.

Abstracts

Hudak Marissa Lauren

Project Title: What makes a positive deviant: utilizing common themes in best practice stroke hospitals to influence institutional quality improvement.

Thematic Area: Public Health and Epidemiology

Abstract: The University of Colorado Hospital (UCH) strived to qualify for the American Stroke Association Target Stroke Honor Roll consistently treating at least 50% of ischemic stroke patients with intravenous tissue plasminogen activator within an hour of arrival, but plateaued at a median treatment time of 71 minutes. Using plan-do-study-act (PDSA) cycles and lean and positive deviance methodology, a multi-disciplinary quality improvement team including hospitalist residents and attendings, stroke program coordinator, and a medical student aimed to lower UCH's treatment time below 60 minutes. Interviews with the positive outliers on the Honor Roll proved crucial for identifying successful interventions, overcoming resistance of key stakeholders, and driving the culture change at UCH. Process, outcome, and balance measures were followed closely. For 2012, our median treatment time was 43 minutes and 68% of patients were treated in less than 60 minutes.

Abstracts

Roberts Sammie Jo

Project Title: Efficacy of combined endoscopic cyclophotocoagulation and cataract extraction: a retrospective review

Thematic Area: Clinical Research

Abstract: Purpose: To examine the efficacy of combined endoscopic cyclophotocoagulation (ECP) and cataract extraction. Methods: A retrospective case review of 91 eyes (73 patients) who underwent combined ECP and cataract extraction. Baseline demographic and ocular characteristics were recorded, as well as post-operative intra-ocular pressure (IOP), number of glaucoma medications, and visual acuity at 1, 3, 6, and 12 months. Treatment failure was defined as less than 20% reduction in IOP from baseline on two consecutive visits at 3, 6, or 12 months post-operatively; IOP ≥ 21 mmHg or ≤ 5 mmHg on two consecutive visits at 3, 6, or 12 months post-operatively; or additional glaucoma surgery performed within 12 months post-operatively. Results: No demographic characteristics were associated with treatment failure. The single ocular characteristic associated with treatment failure was baseline IOP ($p < 0.0001$). Overall, mean IOP was reduced from __ mmHg at baseline to __ mmHg at 12 months ($p =$ __). Mean number of glaucoma medications was reduced from __ medications at baseline to __ medications at 12 months ($p =$ __). At 6 months post-operatively, 75.82% of eyes were classified as treatment success (95% CI: 65.65, 83.36), and at 12 months, 60.44% of eyes were classified as treatment success (95% CI 49.63, 69.63). Conclusions: Combined phacoemulsification and ECP is an effective surgical option for patients with cataract and any of a variety of glaucoma diagnoses and severity in terms of reduced IOP and number of glaucoma medications.

Abstracts

Martyn Ryan David

Project Title: Pedicle Screw Placement in Spine Surgery: A retrospective review of O-arm/Stealth vs Non-Computerized Navigation Techniques

Thematic Area: Clinical Research

Abstract: Study Design. Retrospective review Objectives. To compare the accuracy of pedicle screw placement using O-arm/Stealth Navigation to that of non-navigated pedicle screw placement techniques. Background Summary. Pedicle screws are commonly used for posterior stabilization of the thoracolumbar spine. Misplacement of pedicle screws poses substantial risk for damaging nerves, vasculature, and fracturing pedicles. Intraoperative CT based navigation techniques are commonly used to decrease the risk of pedicle screw misplacement. The results of this study will help guide surgeons as to the best choice for pedicle screw placement to minimize the risk associated with pedicle screw misplacement. Methods. 597 pedicle screws were measured in 70 patients in the axial and sagittal planes using intraoperative CT or postoperative CT. Patients were assigned to either the CT based navigation group or the non-navigated group. Pedicle screws that were entirely within the pedicle were grade I, while screws that had breached the cortex of the pedicle or vertebral body were graded in 2mm increments in the direction of the breach. Results. 58 screws (14.5%) breached the pedicle or vertebral body cortex in the navigated group, while 65 screws (33.2%) breached the pedicle or vertebral body cortex in the non-navigated group. Conclusion. CT based navigated techniques are more accurate than non-navigated techniques for the placement of pedicle screws

Abstracts

Bohn Kevin Andrew

Project Title: Repeat large volume paracentesis vs. tunneled peritoneal catheter placement for malignant ascites: a cost-minimization study

Thematic Area: Clinical Research

Abstract: Purpose: To determine at what point tunneled peritoneal catheter (TPC) placement becomes less costly than repeat large volume paracenteses (LVP) for patients with malignant ascites. Methods: LVP procedure and TPC placement costs were based on 2013 Medicare reimbursement rates. Rates for specific complications were obtained from the literature and assigned costs. A decision tree-based Markov-Monte Carlo model was designed with eleven 10-day cycles to simulate 4000 subjects per trial. Patients were grouped according to initial treatment decision (LVP vs TPC), and the total cost at the end of each 10-day cycle was calculated. The point at which TPC became less costly than LVP was determined. Additional simulations were used for bivariate analyses of all cost and probability variables and trivariate analysis of cycle length and fluid per cycle. Results: Individual input probabilities were not significantly different from corresponding simulation outcomes (p-range 0.068-0.95). When complications were included in the model, the cost curves crossed at $82.8 + 3.6$ days (range 75.8-89.6), corresponding to the time between paracentesis procedure numbers nine and ten. Intersection occurred earlier in simulations with shorter cycle length and less fluid per cycle, but was minimally affected by changing individual complication probabilities and costs. Conclusions: In patients with malignant ascites, LVP becomes more costly once the procedure is performed between nine and ten times, or approximately 83 days if paracentesis is repeated every 10 days with 5 liters removed. TPC has improved cost advantage in patients who receive paracentesis more frequently or have less fluid drained per procedure.

Abstracts

Altoos Basel

Project Title: Assessment of Local Control, Survival and Patterns of Failure following PET/CT Guided Adaptive Radiotherapy of Locally Advanced Non-Small Cell Lung Cancer

Thematic Area: Clinical Research

Abstract: Objectives To evaluate long term local control, survival and failure patterns of patients with locally advanced non-small cell lung cancer (NSCLC) treated with a novel adaptive radiotherapy that monitors and takes advantage of tumor regression during the course of radiation therapy using fluorodeoxyglucose (FDG) positron emission tomography (PET) and computed tomography (CT) imaging. Methods Ten patients with locally advanced and inoperable NSCLC treated with definitive radiation and concurrent chemotherapy were evaluated retrospectively. FDG-PET and CT was used to delineate target volumes prior to initiation of radiation therapy (RT). At a median dose of 42.3Gy (range 30.6 Gy-51.3 Gy) mid-RT PET and CT scans were obtained. An adaptive plan was generated based on mid-RT volumes, and used for the remainder of the treatments (median dose of 20.0 Gy). Final median delivered dose was 67.8 Gy. The initial plan was then scaled up to a dose equal to the final dose that the patient received and was used for comparison with the composite treatment plan (initially delivered and adaptive plan) with regards to normal tissue doses. Local control, long-term survival and failure patterns were determined. Results When comparing the pre-treatment and mid-RT PET and CT, there was a significant reduction in the gross tumor volume (GTV), clinical target volume (CTV) and planning target volume (PTV) by a mean of 78% (p= 0.0026), 69% (p= 0.0025) and 73% (p= 0.0007), respectively. Adapting the radiation plan to take into account the tumor shrinkage during treatment lead to significant average reduction in mean lung dose (17.2 Gy to 15.0 Gy, p= 0.0051) the volume of lung receiving 20 Gy or greater (31% to 27%, p= 0.0056), spinal cord maximum dose (52 Gy to 41 Gy, p= 0.0027), esophageal and heart doses. Five out of the ten patients studied recurred locally (median time to recur 6 months). Two out of these five patients had local recurrences clearly within the initial radiation field but completely outside the boost field, one had their recurrence within the initial field, but only partially located within the boost, one patient had a recurrence that was almost completely encompassed within the boost field. It was difficult to determine the relation of the fifth patient's recurrence relative to the initial and boost fields due to the degree of atelectasis surrounding the recurrent disease. Two patients remain alive and are disease free more than 7 years out from treatment. Conclusion Adapting the treatment plan by taking advantage of reduction in tumor size during treatment allowed the delivery of curative-intent radiation doses to patients with locally advanced NSCLC who would otherwise be limited to lower doses due to normal tissue constraints. Favorable local control and survival outcomes were achieved with this image guided adaptive radiotherapy technique when compared to other series.

Abstracts

Giamberardino Whitney Lee

Project Title: Risk Factors for Clinically Significant Intraventricular Hemorrhage in Pregnancies Complicated by Preterm Premature Rupture of Membranes

Thematic Area: Clinical Research

Abstract: Objective(s): Preterm birth is a cause of adverse perinatal outcomes, including intraventricular hemorrhage (IVH). IVH has been shown to contribute to lasting neurological disability, however the role of maternal characteristics and potentially modifiable risk-factors in relation to outcomes have not been well defined. We sought to determine predictors of IVH in pregnancies complicated by early preterm premature rupture of membranes (PPROM). Study Design: We performed a retrospective cohort study of all singleton pregnancies with early PPRM 22 to 32 weeks gestational age at University of Colorado Hospital (UCH) from 1/1/2007-12/31/2011 (n=229). Clinically significant IVH (Grade III or IV) was the primary outcome of this study. To determine independent predictors of IVH we created a multivariate model including all univariate covariates with p-value of ≤ 0.10 . Results: When adjusted for non-white race, younger maternal age and increased BMI were independent predictors of clinically significant IVH (OR=1.4 CI 1.04-1.79, p=0.03; OR 1.2 CI 1.04-1.33, p=0.01, respectively). Female gender was also found to be an independent predictor of poor 5 minute APGAR (OR=2.3 CI 1.06-5.28, p=0.04). Conclusion(s): Infants born to younger mothers or mothers with higher BMI appear to be at increased risk for clinically significant IVH. On further analysis, we found that female newborns had a 2-fold greater risk of poor 5-minute APGAR of less than 7. Given these data, larger studies are warranted to examine modifiable and non-modifiable risk factors of pregnancy that may be associated with IVH and subsequent adverse neurological outcomes in pregnancies complicated by early PPRM.

Abstracts

Salg Lucas Andrew

Project Title: Brilliant but Damaged: Depictions of Physician Impairment in Media

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Over the last decade, the depiction of doctors in popular culture, especially television, has trended toward a “brilliant but damaged” figure, often one who is addicted to drugs or alcohol, and whose addiction is either ignored or enabled by peers and supervisors. The subtext of this increasingly common trope is that physicians’ personal demons (specifically addiction) are necessary evils because of the stress of the profession and the physicians’ perceived intelligence and commitment to their patients’ well-being. This paper considers the origins of this trope and what its ramifications may be among both physicians and patients who have perhaps unconsciously internalized it, with attention to demographics and statistics of reporting impaired physician colleagues.

Abstracts

Agbim Chisom

Project Title: Acquired torticollis as an initial sign of a posterior fossa tumor in a 6-year-old child: A case report and review of the literature

Thematic Area: Clinical Research

Abstract: Torticollis or “wry neck” is characterized by an abnormal positioning of the neck toward one side with the chin tilted in the opposite direction. Torticollis is always a symptom of an underlying pathology. Acquired torticollis usually presents after infancy and is associated with an array of etiologies. A common but often delayed diagnosis for children presenting with acquired torticollis is a tumor of the posterior cranial fossa. Our case report describes a 6-year-old previously healthy female who presented to the pediatric emergency department with 2 weeks of torticollis of unknown origin. The goal of this paper is to present a common but often missed etiology for acquired torticollis and to discuss the importance of having a high index of suspicion to properly diagnose and treat patients with acquired torticollis.

Abstracts

Ground Kelly Louise

Project Title: The Family Caregiver Activation in Transitions Tool (FCAT): A New Measure of Family Caregiver Self-Efficacy

Thematic Area: Clinical Research

Abstract: Introduction: Family caregivers play an instrumental role in the care of patients during the vulnerable time of care transitions and yet many lack skills and confidence to be effective. The Family Caregiver Activation in Transitions (FCAT) tool was developed with direct input from family caregivers to assist health professionals better prepare family caregivers for their role. Theory and Methods: The validation of the Family Caregiver Activation in Transitions tool was completed in three phases. In the first phase, cognitive testing was conducted in convenience samples of family caregivers (n = 54) in two geographic locations. In the second phase, testing was conducted (n = 50) to determine item fit and item difficulty. In the third phase, the tool's psychometric properties were examined in two waves of recruitment (n = 187; n = 247) from a national sample. Results: Participants recommended revising the script, reducing redundancy, and simplifying item structure and language. Analysis of item fit and difficulty guided subsequent item reduction. The estimated person-separation reliability (akin to Cronbach's alpha) was 0.84. Discussion and Conclusion: The Family Caregiver Activation in Transitions tool has the potential to enhance family caregiver engagement and activation and thereby positively influence clinical practice during care transitions. Key Words: Care Transitions, Family Caregivers, Integrated Care, Measurement, Patient Engagement, Self-management

Abstracts

Badani Shelby Alaine

Project Title: Reducing pneumonia readmission rates

Thematic Area: Clinical Research

Abstract: Starting in 2013, the Centers for Medicare and Medicaid Services (CMS) will reimburse hospitals for pneumonia admissions based on readmission rates in comparison to the national average. In addition, the CMS will also begin tying incentive payments to the rates of hospital compliance with core measures starting October of 2012. Based on data from University Hospital Consortium (UHC) and internal audits, the 30-day pneumonia readmission rate at the University of Colorado Hospital (UCH) is between 12.2-20.2%. A recent chart review at the UCH indicates treatment failure and adverse drug events account for up to 24% of pneumonia readmissions. Furthermore, the rate of compliance with the core measure of pneumonia vaccination administration has decreased from 100% to 70.3% in the first quarter of 2012. The aim of our project is to improve the quality of care for pneumonia patients through the implementation of a standardized pharmacy consult on hospital admission to address antibiotic therapy, potential drug-drug interactions, medication access, and compliance with vaccination core measures. **Methods** We implemented a standardized pharmacy consult for all patients admitted with the diagnosis of pneumonia on three medicine ward services run by hospitalists at UCH. The standardized pharmacy consult consisted of a review of patient's diagnosis, current therapy, renal and liver function, medication interactions, microbiology data, immune-compromised status, vaccination history, and insurance data in order to make recommendation for both inpatient and discharge antibiotics. In addition to following the patients throughout their hospital course, the pharmacist ensured compliance with core measures, including vaccination administration, prior to discharge. We collected data on 30-day readmission rates and core measure compliance, in addition to monitoring antibiotic prescription trends, rates of patients receiving pharmacy consults, provider satisfaction, and overall cost. **Results** During the first four weeks of our intervention beginning August 1st, 2012, 5 patients were admitted with the diagnosis of pneumonia on the hospitalist teams. Four (80%) received pharmacy consults. Of the patients consulted, antibiotic recommended by pharmacy as compared to the initial order was altered twice (50%). Pneumococcal vaccination rate was 75%, with the unvaccinated patient being due to a refusal of the vaccine. Based on provider feedback, a main barrier to consult placement was low rates of pneumonia admission and incorporating the intervention into clinician's work-flow. The next step to reduce readmissions included making an orderset that contains an automatic consult to pharmacy. **Conclusion** Performance-based reimbursement will drastically re-shape healthcare delivery for patients with pneumonia. Our project targets specific processes of care for pneumonia patients that are in need of improvement. With the emergence of electronic medical records, further quality improvement interventions can be expected to have a sustained effect when built into a part of routine physician work-flow within our hospital system.

Abstracts

Tjossem Jenna

Project Title: Assessing Healthcare Providers' Knowledge of Culturally Appropriate Nutrition for Hispanic Patients

Thematic Area: Public Health and Epidemiology

Abstract: The top cause of morbidity and mortality in the Denver Hispanic and Latino population is cardiovascular disease. Although progression of cardiovascular disease is has been linked to dietary and nutritional habits, many area providers feel less confident in assessing the nutritional status of and making specific dietary recommendations to these patients than their Caucasian counterparts. In this study, area providers were surveyed to assess their comfort level in addressing these topics with Hispanic patients and baseline knowledge of the typical Hispanic diet and its healthfulness. Overall, our results suggest that providers feel that they do need to approach nutrition counseling differently with their Hispanic versus non-Hispanic patients, use traditional ethnic foods in their dietary counseling but feel generally ill equipped to do so. We have identified shortcomings of our training in culturally effective medicine, especially with regard to healthfulness of traditional foods and have found opportunities to further educate healthcare providers in these areas.

Abstracts

Rosenberg Ethan James

Project Title: Emergency Service Use Among a Sample of Shelter-Based Runaway and Homeless Youth

Thematic Area: Public Health and Epidemiology

Abstract: Emergency service use among a sample of shelter-based runaway and homeless youth
Purpose: Emergency department (ED) use among homeless adults is a costly, prevalent, and poorly understood problem. ED use in runaway and homeless youth (RHY) is less studied, and given policy and programming concerns about over- and under-use of emergency services with longitudinal impacts on housing, and the implementation of the Affordable Care Act, we undertook a study to document patterns, perceptions, and reasoning behind ER use among sheltered RHY in an urban setting. Methods: Exploratory study via self-report survey of RHY living in a youth homeless shelter in Denver, CO (Urban Peak) from July-August 2012. Survey included: demographic characteristics, geographic transience, nativity, insurance coverage, ED use, reason(s) for ED visit(s), and substance use. Descriptive statistics were completed; no multivariate analysis was completed due to small sample size. Results: 33 youth (50%) served at Urban Peak from July-Aug 2012 were interviewed. 42% were covered by a public health insurance plan; 63% reported no primary care, 18% had no health insurance and 12% unclear about their insurance status. 55% had used ED services in the past year while 18% had 4 or more visits. 45% reported that their ED visit was substance use related; 23% due to alcohol use, 35% due to drug use, and 13% after using both. 38% of the youth reported being transported to the ED by ambulance irrespective of acuity reason. Conclusions: Our study shows many RHY utilize ER's, with visits related to lack of access to primary care and substance use. Most of these visits are not covered by health insurance, placing financial strain on the public health and hospital systems and potentially impeding access to housing through debt and resultant low credit scores. Many ED visits involved substance use. Further research might lead to clues on how drug or alcohol use plays into the ED visit or how ED diversion interventions might be developed for those cases that are not true emergencies. This could be remedied by medical home and primary care systems tailored to RHY. Many youth were unclear about their current insurance status, let alone knowing conclusively how their ED visit was paid for. Finally, a remarkable number of youth were transported to the ED via ambulance, likely due to agency policy for calling for emergency transportation rather than triaging health needs. This finding might be addressed with agency-hospital collaborative plans for less-costly triaging systems.

Abstracts

Wannamaker Eric

Project Title: Improving Transitions of Care Through Follow-up Phone Calls For Hospitalized, Elderly Patients

Thematic Area: Clinical Research

Abstract: **BACKGROUND:** Approximately 20% of discharged Medicare patients are re-admitted within 30-days, and a high percentage of discharged patients have prescription related problems. Numerous studies have demonstrated the potential efficacy of follow-up phone calls in improving patient care following discharge from the hospital, although there is not a standardized or universal system for conducting these calls at this hospital. **OBJECTIVES:** To assess the presence, nature, and scope of post-discharge problems for elderly patients using post-discharge follow-up calls and the Quality Improvement (QI) methodology of Plan-Do-Study-Act (PDSA) cycles. Inform improvements in geriatric patient transitions following hospital discharge with the dual goals of reducing 30-day readmission rates and improving patient satisfaction. **METHODS:** Patient follow-up calls were conducted on English-speaking patients discharged to home from the Acute Care of the Elderly (ACE) service, ideally within 24 hours of discharge. Calls assessed four areas: (1) new or worsening symptoms, (2) problems with medications, (3) problems with homecare or durable medical equipment, and (4) primary care follow-up appointment scheduling. During the first PDSA cycle, a single physician performed post-discharge follow-up calls assessing the four areas above. For the second PDSA cycle, multiple physicians on a single hospital floor performed follow-up calls using a standardized data collection form developed based on the findings of PDSA 1. For the third PDSA cycle, we explored performance of calls by non-physician personnel. **FINDINGS:** 72% (23/32) of patients called were able to be reached during the first PDSA cycle with 57% overall reported a problem in one of the four areas. 17% had medication problems, 30% had new or continuing symptoms, 13% had homecare or DME problems, and 13% had problems with a PCP follow-up appointment. In PDSA 2, 92% (22/24) of patients called were reached – of these 41% reported a problem or question in one of the four areas with medication issues (30%) being the most frequent complaint. Complete adherence of follow-up call protocol by physicians was not achieved resulting in inconsistent impact of the intervention as the project was expanded from a single champion to a wider set of providers. In the third iteration, floor nurses called patients after discharge. 42% (43/103) of patients were reached; however, this pilot was terminated. Sustainability was limited by concerns about liability, ability of non-physicians to appropriately triage problems raised in the calls, and time commitment by unit staff. **CONCLUSIONS:** The results of PDSA's 1 and 2 indicate that further investigation into patient discharge transition is warranted. Significant problems with effective and clear discharge transitions were identified suggesting need for system-based intervention. PDSA 3 revealed additional training would be required for non-physician providers to comfortably perform the calls. Information from the PDSA cycles has informed the development of questionnaires for subsequent PDSA cycles.

Key barriers which would need to be resolved in future iterations include: 1. Dedicated time to deliver calls 2. Triage algorithms and training to address or escalate common issues raised by patients 3. Improved collecting of contact information during hospitalization 4. Standardized script to assure all critical elements are addressed. Consistent system-based processes of care such as this are essential to a high-reliability institution. Identification of the substantial proportion of patients who are having questions or problems during hospital transition to home has potential to improve patient satisfaction and allow issues to be addressed to avert readmission.

Abstracts

Doan Hien

Project Title: Review of the Epi4k gene discovery project, HBP1 as a novel genetic influence in epilepsy.

Thematic Area: Basic Science

Abstract: HBP1 is a transcriptional repressor of the HMG box family has been shown to play a role in the suppression of Wnt signaling and cell proliferation. A discovery that HBP1 knockout in mice developed spontaneous seizures and epilepsy was recently made. Further investigation found that these mice had increased mTOR signaling in the CA1 region of the hippocampus. Increased mTOR signaling along with abnormal Wnt signaling have been found to correlate to the development of certain epilepsies and neurological disorders. These recent findings shine light on a novel genetic influence of epilepsy and open doors to new opportunities to translate cancer related therapies into studies of epilepsy. Thus far there has not been any published study implicating HBP1 in the development of epilepsy. Epilepsy is a complex disease with complex genetic backgrounds. Understanding the genetic architecture of epilepsy has been challenging. To update our knowledge of genetics in epilepsy may guide future research and what role HBP1 may have. -This literature review discusses the collaborative project Epi4K, the largest sequencing project aimed at discovering novel genetic influences of epilepsy to date. The findings published from this project thus far will be discussed. The genes previously shown to be associated with epilepsies, which the Epi4K project found supporting evidence of, will be highlighted. The roles of the Wnt and mTOR pathways may have in the susceptibility and development of epilepsy will also be discussed as the gene of interest has shown association with these pathways.

Abstracts

Unnithan Rachna

Project Title: Assessing Brief Changes in Adolescents' Mood: Development, Validation and Utility of the Fast Assessment of Children's Emotions (FACE)

Thematic Area: Clinical Research

Abstract: Understanding the impact of brief interventions and interactions is important to strengthening Patient Centered Outcomes Research and improving quality of care for patients. Appropriate assessment tools must be easy to administer, age appropriate, and psychometrically sound. Isolating and measuring the impact of single interventions within fast-paced multidisciplinary medical treatments can be difficult. Assessing mood change is a useful evaluable construct that is responsive to brief interventions and interactions. In this study we examined the validity and reliability of a new measure, the Fast Assessment of Children's Emotions (FACE), that assesses brief changes in six mood states of adolescents. Following parental consent and youth assent, 61 patients ages 12 - 17 years were recruited from the psychiatry services at a large Children's Hospital. Participants completed the FACE, as well as a longer mood questionnaire, the Brunel University Mood Scale (BRUMS), and a measure of satiety at three time points - before a sixty minute psychotherapeutic intervention, after the psychotherapeutic intervention, and after lunch. The FACE measure was significantly correlated with the BRUMS ($r^2 = .85$; $p < .001$) and not correlated with the satiety measure ($r^2 = -.17$; NS). Chronbach's alpha for the FACE was 0.7734. The FACE showed significant changes in mood from before to after the intervention for all patients. For general psychiatry patients, the FACE did not change significantly after lunch; although for patients with eating disorders the FACE did indicate an increase in distressed emotions after lunch. This indicates sensitivity to change in a clinically meaningful manner.

Abstracts

Hurley Carly Elise

Project Title: Contraception after second trimester abortion: characteristics of immediate LARC acceptors and comparative repeat pregnancy rate

Thematic Area: Clinical Research

Abstract: Title: Contraception after second trimester abortion: characteristics of immediate LARC acceptors and comparative repeat pregnancy rates Objectives: To compare characteristics of immediate post-abortion LARC acceptors versus those choosing other contraceptives among second-trimester abortion patients, and evaluate 12-month repeat pregnancy and abortion. Method: Participants undergoing elective second-trimester abortion at NY Presbyterian Hospital were offered immediate post-abortion initiation of any contraceptive. Those choosing IUDs or implants comprised the LARC group; women selecting any other contraceptive were comparators. Group characteristics were compared. Twelve months of post-procedure records were analyzed for discontinuation of LARC method, repeat pregnancy and repeat abortion. Results: 305 women enrolled, 171(56.1%) received LARC (11% implants, 48% copper-Ts, 41% LNG-IUS). The cohort was predominantly young, Latina, parous, and publicly-insured. Women with ≥ 2 children more likely chose LARC versus nulliparas, OR=2.53 (95%CI 1.33-4.81). No other variables associated with choosing LARC; no differences existed between choosers of different LARCs. Non-LARC acceptors (n=134) chose DMPA(26%), COCs(18%), condoms(7%), vaginal ring(5%) or other(12%) ; 32% were non-specified. By 12 months, 13.1% became pregnant (non-acceptors, 23.9%; LARC, 4.7%; OR=6.41 (95%CI 2.83-14.49)). 14.2% of the non-LARC and 0.6% of the LARC group had repeat abortions (OR 9.2, 95% CI 2.7-32.3). All LARC pregnancies occurred after device removal. Age, gravidity, prior abortions, and race were associated with repeat pregnancy among LARC recipients; among non-LARC recipients no variables were associated with repeat pregnancy. In multivariable analysis of repeat pregnancy risk, only choosing LARC remained significant. From paper "In multivariable analysis, lower gravidity and removal of LARC remained significantly associated with repeat pregnancy." Among LARC acceptors 12.9% discontinued ≤ 12 months. Time-to-discontinuation did not differ among the LARCs. Conclusions: LARC immediately following second-trimester abortion has high continuation and prevents repeat pregnancy and abortion in the ensuing 12 months. Affiliations: (1) University of Colorado Anschutz Medical Campus, Aurora, CO, USA (2) Columbia University College of Physicians and Surgeons, New York, NY, USA

Abstracts

Davern Monica

Project Title: snAPP: Student's Novel Approach to Practice Problems

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: During preclinical medical training, students are frequently assessed by faculty-written examinations. Although examinations are useful for assessing student competency, their efficacy as powerful learning encounters is often underutilized. Evidence indicates that practice testing is a potent predictor of examination performance, yet medical curricula do not consistently employ practice testing as a learning tool. Students frequently request practice items from faculty before examinations, but time and resource constraints make the creation of such questions difficult. Six first-year students at the University of Colorado created approximately 3400 multiple-choice practice questions. Original questions were created for personal use during examination preparation, based on lecture and reading content, guided by learning objectives, and generated before student exposure to formal examinations. The following summer, students and faculty collaboratively revised the original practice questions before publishing them into a mobile learning application available to incoming Year 1 students. Student-writers received training on evidence-based test item writing before beginning the review process. Questions found to be acceptable after two rounds of student revision were sent to faculty lecturers for final approval. Approximately 600 questions written throughout the year were derived from the 'Molecules to Medicine' basic science curricular block. Of these, 423 items passed all three rounds of editing and were compiled into a resource database entitled 'Students' Novel Approach to Practice Problems' (snAPP). Organized into 32 quizzes, questions deployed daily in synchrony with the Year 1 lecture schedule. Quiz lengths ranged between 12 and 20 questions, with three to five items representing each lecture hour. Quizzes remained accessible until the weekend, when explanatory answer keys were posted. Access to the mobile learning application was limited to iPod, iPad and iPod Touch devices. All content was simultaneously available online via BlackBoard Learn. Analysis evaluated practise item quality and utilization, in-class performance, and performance on a cumulative examination administered at year-end. A feedback questionnaire assessed student satisfaction. Findings suggest that well-constructed test items written by medical students positively impacted learning. More than 88% of students utilised practise questions and the test items performed well (Cronbach's $\alpha = 0.96$, mean question performance, 0.71). Use of student-written practise questions had a positive, dose-dependent impact on examination performance ($r = 0.164$, $p = 0.044$; $n = 154$). Anonymous student comments were collected at the end of the academic block and analysed. In response to an open-ended question asking students to 'identify three aspects of the block that supported their learning', formative assessments were the most frequently identified response category, with 29.6% of students specifically identifying snAPP as a unique channel for active learning. Over 48% of students endorsed the continuation of the project as being 'extremely important' to their

medical education. Widely embraced by learners and faculty, student-written practice questions represent a promising strategy for augmenting medical student learning.

Abstracts

Ellis Byron Jason

Project Title: A biomechanical comparison of anterior cruciate ligament suspensory fixation devices in a porcine cadaver model

Thematic Area: Clinical Research

Abstract: Background: Suspensory fixation use during anterior cruciate ligament reconstruction has increased due to ease of use and high pullout strength. We hypothesize that there are no significant differences in biomechanical performance among four types of suspensory fixation devices: Stryker VersiTomic G-Lok, Smith & Nephew Endobutton, Biomet ToggleLoc, and Arthrex RetroButton. Methods: Forty fresh frozen porcine femurs and flexor digitorum profundus tendons were obtained. Each tendon graft was sized to 8.5 mm or 9.0 mm. Ten of each device were used to fix the grafts in the femur at the 2 o'clock (left) or 10 o'clock (right) position. The graft–femur complex was secured to a servohydraulic test machine in line with the femoral tunnel. The graft was cyclically loaded from 50 to 250 N for 1000 cycles at 1 Hz then loaded to failure at 20 mm/min. Actuator load and displacement were recorded. Data were analyzed with multiple one-way ANOVA and Tukey HSD post-hoc tests. Bonferroni correction was applied resulting in $P \leq 0.005$ considered statistically significant for ANOVA, $P \leq 0.05$ for Tukey. Findings: There were no significant differences in cyclic displacement among any of the groups ($P = 0.43$). The only significant difference in failure properties is the Endobutton exhibited at least 50% greater displacement at failure than the other three devices. Interpretation: Suspensory femoral soft tissue fixation devices are biomechanically similar with respect to failure load but differ in failure displacement. However, there was no significant difference in displacement after cyclic loading. All four fixation devices should withstand the forces associated with daily activities without failure.

Abstracts

Reinick Christina Lee

Project Title: Association of apolipoprotein B, LDL-C and vascular stiffness in adolescents with type 1 diabetes

Thematic Area: Clinical Research

Abstract: **Aims** LDL cholesterol (LDL-C) is the current lipid standard for cardiovascular disease (CVD)-risk assessment in type 1 diabetes. Apolipoprotein B (apoB) may be helpful to further stratify CVD risk. We explored the association between apoB and pulse wave velocity (PWV) to determine if apoB would improve CVD-risk stratification, especially in type 1 diabetes adolescents with borderline LDL-C (100–129 mg/dL). We hypothesized that type 1 diabetes adolescents with borderline LDL-C and elevated apoB (≥ 90 mg/dL) would have increased PWV compared to those with borderline LDL-C and normal apoB (< 90 mg/dL), and that apoB would explain more of the variability of PWV than alternative lipid indices. **Methods** Fasting lipids, including apoB, were collected in 267 adolescents, age 12–19 years, with diabetes duration > 5 years and HbA1c 8.9 ± 1.6 %. Triglyceride to HDL-C ratio (TG/HDL-C) and nonHDL-cholesterol (nonHDL-C) were calculated. PWV was measured in the carotid–femoral segment. **Results** ApoB, nonHDL-C and TG/HDL-C correlated with PWV ($p < 0.0001$). ApoB, nonHDL-C and TG/HDL-C remained significantly associated with PWV in fully adjusted models. In adolescents with borderline LDL-C ($n = 61$), PWV was significantly higher in those with elevated apoB than in those with normal apoB (5.6 ± 0.6 vs. 5.2 ± 0.6 m/s, $p < 0.01$) and also remained significant after adjustment for CVD-risk factors ($p = 0.0002$). Moreover, in those with borderline LDL-C, apoB explained more of the variability of PWV than nonHDL-C and TG/HDL-C. **Conclusion** Elevated apoB is associated with increased arterial stiffness in type 1 diabetes adolescents. Measurement of apoB in addition to LDL-C may be helpful in stratifying CVD risk in type 1 diabetes adolescents, especially in those with borderline LDL-C.

Abstracts

McKinnon Marie Rose

Project Title: HPV Vaccination in Correctional Care Settings: Knowledge, Barriers, and Rates of Vaccination Among Female Inmates

Thematic Area: Public Health and Epidemiology

Abstract: Cervical cancer rates are disproportionately high among women in correctional care facilities. Increased rates of HPV infections, an important risk factor for cervical cancer, have been suggested as a possible explanation. The HPV vaccine is an effective way to prevent infections with some of the HPV strains most associated with cervical cancer. HPV vaccination rates are not collected in correctional care facilities. This study will survey 200 women ages 18-26 in the Denver Women's Correctional Facility. The survey addresses HPV vaccination rates in comparison to rates of influenza and hepatitis B vaccination as well as national statistics as its main outcome measure. As secondary outcome measures, the survey addresses women's knowledge about the HPV vaccine and its association with cervical cancer as well as barriers and attitudes towards receiving the vaccine. This information will have important implications for possible interventions that will be focused on providing the vaccine in correctional care settings.

Abstracts

Catanach Brittany

Project Title: Older Adults with Severe Anorexia Nervosa: Higher than Expected Prevalence, Good Outcomes During Medical Stabilization

Thematic Area: Clinical Research

Abstract: Objective: Relatively little has been written specifically about the cohort of patients, 35 years and older, with anorexia nervosa, which we term “anorexia nervosa of older adults” or ANOlAd. This is the first paper to report in detail on outcomes of early medical stabilization of critically ill patients with anorexia nervosa in this age demographic. Method: We retrospectively evaluated clinical parameters relevant to acuity of illness and outcomes of early refeeding in 142 adults with severe anorexia nervosa, admitted for definitive inpatient medical stabilization from October 1, 2008 to December 31, 2012. Results: Forty-five patients (32%) were 35 years or older in age, with a median age of 47 years old (range 35-65 years). The younger cohort had a median age of 25 years old (range 17-34 years). The AN-OlAd group presented with significant medical complications of underweight, statistically equal to that of the younger cohort, including low % of ideal body weight ($63.5 \pm 8.6\%$), BMI on admission ($13.2 \pm 1.8 \text{ kg/m}^2$), and incidence of bradycardia (70.5%), hypoglycemia (40%), severe liver dysfunction (24.4%), and rate of refeeding hypophosphatemia (33%). The older cohort had less evidence of bone marrow suppression than the younger cohort. Discussion: Patients with AN-OlAd enter our program as underweight and ill as their younger peers and do as well during early medical stabilization. On the basis of age alone, they should not be declined further opportunities to receive effective treatment, as they do as well as a younger cohort during their early stages of medical hospitalization

Abstracts

Barton Amanda

Project Title: Choking in an Infant: Educating Parents to Save Lives

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Every year thousands of children are affected by choking on an object with parents and caregivers who do not know how to help them. As many as 38% of these children are <1 year of age. This project aims to help these children by educating parents on the techniques used to dislodge a foreign body from an infant airway. We will incorporate a parent education course on this topic during their post-partum stay at University of Colorado Hospital. The course will be a hands-on course with nurses using Resuscitation Annie doll as well as the parents' newborn to teach the techniques for holding the child as well as actual practice in performing the techniques. There will also be a parent survey for quality assurance and improvement. Every family will be sent home with a pamphlet with picture instructions concerning what they have learned with resources available for refreshers or other information. We hope to bridge the knowledge gap between medical personnel and primary caregivers to prevent adverse events as related to airway obstruction.

Abstracts

Dear-Ruel Amy Marie

Project Title: Blackfeet Home Visitation Curriculum and Introduction of the Family Spirit Program to the Blackfeet Tribe in Browning, Montana

Thematic Area: Public Health and Epidemiology

Abstract: This project includes the development and authorship of the Blackfeet Home Visitation Curriculum, a curriculum implemented to address the problem of the high rate of substance abuse among pregnant women and in utero drug exposed babies born into the Blackfeet Tribe. The curriculum was completed in October 2012 and delivered by Community Health Representatives (CHRs) and Public Health Nurses (PHNs) of the Blackfeet Tribe. The curriculum targets at-risk pregnant women and new mothers, focusing on teen and/or substance abusing mothers. It served as an interim curriculum until finances were procured for an evidence-based American Indian-focused home visitation program called Family Spirit. Facilitation of acquisition of the Family Spirit curriculum for the Blackfeet Tribe was the final goal of the project. Training of 7 CHRs and 1 PHN in Browning, Montana was completed by the John Hopkins Center for American Indian Health's Family Spirit Program Coordinators in September 2014.

Abstracts

Rosen Sheri Ann Borbon

Project Title: Systematic Review of Perioperative Prophylactic Antibiotics for Skull Base Surgeries

Thematic Area: Clinical Research

Abstract: **Background** Perioperative antibiotics are commonly used in endoscopic skull base surgeries as prophylaxis for infectious complications such as meningitis. The role of perioperative prophylactic antibiotics in endoscopic sinus surgery is unclear, and their routine use in endoscopic skull base surgery is also highly debated. Currently, there is no formal recommendation for perioperative antibiotic use in skull base surgery and regimens vary greatly from one institution to the next. **Objective** To assess perioperative antibiotics as prophylaxis against infectious complications in patients undergoing endoscopic skull base surgery. **Methods** A systematic review examining perioperative antibiotic use in endoscopic skull base and craniofacial surgeries was conducted. Inclusion criteria included prospective or retrospective study design, and clinical trials related to the use of antibiotics within 30 days of skull base surgery. Endpoints included infectious complications such as 1) meningitis and 2) sinusitis. **Results** 2,543 publications were identified by the initial search, and 5 met inclusion criteria. The five eligible trials were all observational and involved different types of skull base surgical procedures and antibiotic regimens. **Conclusions** Despite institutional variability in antibiotic regimens, meningitis rarely occurs after skull base procedures and appears to be encountered most frequently in open craniofacial surgeries. Systematic review revealed a limited number of published trials, all observational in study design, precluding a formal meta-analysis. A novel large-scale randomized controlled clinical trial is needed to evaluate antibiotic selection and need in endoscopic skull base surgery.

Abstracts

Heuser Lindsay

Project Title: The Power of Perception: Understanding healthcare discrimination and empowering community members through therapeutic writing

Thematic Area: Public Health and Epidemiology

Abstract: The Power of Perception: Understanding healthcare discrimination and empowering community members through therapeutic writing
Introduction: Community-Students Together Against Healthcare Racism is a partnership between health professional students and community members dedicated to reducing healthcare disparities. This project will explore the utility of a formalized writing curriculum as an intervention to promote self-advocacy at health appointments.
Methods: A three-part writing curriculum was co-developed with community members. Post-workshop surveys were given to all participants. Survey questions elicited information on the curriculum's immediate impact on participants using Likert items scaled from 1 to 5. The mean, median, and mode were obtained for each Likert item. Qualitative feedback on materials and content was also obtained.
Results: Six community members completed the curriculum. Likert item analysis showed mode values of 5 for the following items: likelihood to use writing as a therapeutic tool in the future, likelihood to share what I learned with others, and likelihood to recommend workshop to others.
Conclusions: Therapeutic writing may represent an effective method to engage community members in self-advocacy exercises. The ability to evaluate the efficacy of the writing curriculum was impacted by the small number of participants. More data on immediate and long-term impact will need to be obtained to better assess therapeutic writing as an intervention.

Abstracts

Lebin Jacob A

Project Title: Reduced Street Prices and Quantity Discounts for Diverted Extended Release OxyContin and Opana Following Crush Resistant Reformulation

Thematic Area: Public Health and Epidemiology

Abstract: Introduction: The nonmedical use and abuse of prescription opioids is a growing problem encountered by emergency physicians. Street price data has been suggested as an indicator of drug supply, demand, and abuse potential of diverted prescription opioids. With the advent of crush resistant formulations, street price can be utilized to monitor and evaluate such marketplace interventions and public health initiatives. Objective: To determine street prices for diverted prescription opioids following the introduction of crush resistant extended release reformulations of oxycodone (OxyContin ER) and oxymorphone (Opana ER). Methods: Street price data were collected using the RADARS® System StreetRx website, StreetRx.com. Site users anonymously submitted prices they paid for or heard were paid for diverted drugs, specifying the formulation and dose, between January 2012 and October 2014. Geometric mean price was calculated for comparing prices per milligram (mg) of drug in US dollars. Oxycodone and oxymorphone tablets were grouped into two formulation categories: crushable (immediate and extended release) and crush resistant extended release. For each formulation category, three tablet strength categories were used: ≤ 15 mg, 20 to 40 mg, and ≥ 60 mg. Results: A total of 6610 oxycodone and 244 oxymorphone street price reports were obtained. For tablet strengths less than 60 mg, the geometric mean price for crush resistant oxycodone was less than the crushable equivalent (Table, * denotes $p \leq 0.05$). For all oxycodone formulations, the geometric mean price per mg decreased, by a magnitude of 45-66%, as tablet strength increased. For all tablet strengths, the geometric mean price for crush resistant oxymorphone was less, by a magnitude of 45-56%, than the crushable equivalent ($p \leq 0.001$). Conclusion: The street prices of crush resistant formulations of OxyContin ER and Opana ER are significantly lower than their crushable immediate and extended release equivalents across multiple tablet strengths. These data suggest that buyers of diverted prescription opioids find crush resistant formulations less desirable and support their role in curbing opioid abuse. The observation that price per mg decreased as tablet strength increased may represent a quantity discount phenomenon, by which buyers receive a lower price per mg for larger purchases as sellers minimize distribution risks.

Abstracts

Law Luke Aaron

Project Title: Gas6/TAM Pathway Signaling in Hemostasis and Thrombosis

Thematic Area: Basic Science

Abstract: The Gas6/TAM signaling pathway is essential for platelet activation and thrombus stabilization. Inhibition of this pathway results in decreased platelet aggregation, shape change, clot retraction, aggregate formation under flow conditions, and surface expression of activation markers. The in vivo protection from arterial thrombosis via ferric chloride-induced carotid injury and venous thrombosis in IVC ligation or collagen/epinephrine-induced pulmonary embolism models is similarly well-established. Comparable results are observed in wild-type mice treated with Gas6/TAM antagonists and mutants devoid of Gas6 or one of its receptors. Since the knockout mice are known to have normal hemostasis labs and do not exhibit either spontaneous or prolonged bleeding, this pathway represents an attractive potential target for novel antiplatelet agents.

Abstracts

Brennan Douglas

Project Title: Clinical validation of 4DCT-ventilation with pulmonary function test data

Thematic Area: Clinical Research

Abstract: Clinical validation of 4DCT-ventilation with pulmonary function test data Purpose: 4 dimensional computed tomography (4DCT) is used during treatment planning for thoracic tumors in radiation oncology. The images are used for tracking tumor movement to optimize treatment, but may also be used for determination of pulmonary function. Clinical implementation requires adequate validation of 4DCT-ventilation with an established method of estimating pulmonary function. The purpose of this research is to compare 4DCT-ventilation with pulmonary function testing (PFT). Methods and Materials: Ninety-nine patients with both PFT results and 4DCT imaging were selected for the study. The indices derived from PFT's were as follows: FVC (Forced Vital Capacity) is the total volume of air that the patient can forcibly exhale in one breath. FEV1 (Forced Expiratory Volume in One Second) is the volume of air that the patient is able to exhale in the first second of forced expiration. Values of FEV1 and FVC are measured in liters or as a percentage of the predicted values for that individual. 4DCT data, deformable imagery registration, and a density-change-based model (based on Hounsfield Units) were used to compute a 4DCT-based ventilation map for each patient. The percent ventilation was calculated in each lung. Results: Overall the 4DCT-ventilation metrics showed good correlation with the PFT data. Ventilation-V20 had correlation values of 0.76 and 0.67 with FEV1 and FEV1/FVC respectively, and the CoV had correlation values of 0.75 and 0.67 with FEV1 and FEV1/FVC respectively. Patients with identified ventilation defects had an average FEV1 of 55.5%, while patients with no noted defects had an FEV1 value of 67.9%. These results approached significance ($p=0.07$). Conclusions: The results of this study show a clear validation of 4DCT-ventilation as a method of assessing pulmonary function. It builds on earlier studies comparing 4DCT-ventilation to other imaging modalities. We found good agreement between 4DCT-ventilation and PFT values, further supporting the integration of 4DCT ventilation into clinical practice.

Abstracts

Luckow Michael Jun

Project Title: The Relationship Between Medical Student Participation in Rural Track Programs in Medical Schools and Practice in Rural Areas Following Residency

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: The longstanding shortage of physicians in rural areas in the US is widely known, but there has been little to no improvement for decades despite numerous studies examining the causes and identifying solutions. The objective of this study was to examine the connection between medical student participation in rural track programs in medical schools and their practice in rural areas after residency. Data was collected from all 38 known rural track directors of US medical schools through an online survey, and findings demonstrate that medical students who participate in a rural track program are more likely than other students to enter a primary care residency and practice in a rural area following residency. The medical and scientific literature in this field was also reviewed, and the findings of those studies and evidence-based recommendations are discussed. The most effective means of increasing the number of rural physicians is for medical schools to admit students who grew up in rural areas, express an intention to practice family medicine, express an intention to practice in a rural area after residency and give them rural clinical experience during training.

Abstracts

Connelly Alexander George

Project Title: Strategic Placement of Automated External Defibrillators in High-Risk Neighborhoods

Thematic Area: Public Health and Epidemiology

Abstract: There are over 300,000 Out-of-hospital Cardiac Arrests (OHCAs) every year, with survival of only about 1/10 people experiencing an OHCA. Bystander Cardiopulmonary resuscitation (CPR) has been shown to improve survival rates, although only about a fourth of those in Denver experiencing an OHCA receive this form of pre-hospital intervention, and only about 4% had bystander utilization of an Automated External Defibrillator (AED). The purpose of this project is to analyze locations of OHCA incidents as well as AED locations, and use GIS mapping software with public data to identify mismatch of cardiac risk and AED availability for placement of Red Cross-supplied devices to improve OHCA event survival in the Denver Metro area. This project utilizes the Strategic Management And Resource utilization Team (SMART) AED Program developed by the University of Colorado, Denver Department of Emergency Medicine in collaboration with the Red Cross Save A Life – Denver Program. Another major contributor to the utilized AED registry was this Summer’s competition-style “AED Scavenger Hunt.” This was a multi-sponsored event where individuals were invited to search the Denver Metro area for AEDs and submit their specific locations as well as hours of availability information over a period of one week. With the completion of data collection of locations and geographic information systems (GIS) mapping, we targeted twelve statistical neighborhoods in the city and county of Denver in three separate regions determined to be high-risk based on spatial analysis of mismatch of AED availability and incidence of cardiac events. Our team was also aided by community partners to identify locations for AED placement that do not yet have defibrillator coverage and are open to the public. These devices have now been implemented in ‘hotspot’ locations throughout Denver County. We expect that this work-in-progress will improve OHCA survival in the City and County of Denver.

Abstracts

Berlinberg Adam

Project Title: Pharmacologic inhibition of NFkB alone and in combination with taxane based chemotherapy for the treatment of advanced thyroid cancer

Thematic Area: Basic Science

Abstract: Nuclear factor-kB (NFkB) is activated in many cancers and plays a key role in promoting cell proliferation, survival, and invasion. This pathway has also been shown to play a role in resistance to chemotherapy and radiotherapy in some cancers. Most patients with advanced thyroid cancer are resistant to standard chemotherapy. We hypothesize that inhibition of NFkB signaling (bortezomib) will sensitize thyroid cancer cells to standard chemotherapy (docetaxel). Bortezomib and docetaxel do not act synergistically to inhibit cell proliferation. Invasion is inhibited by combination treatment more than either drug alone. The combined drug treatment activates the apoptosis pathway, while only bortezomib activates the Caspase pathway alone. Initial studies in flank xenograft mouse models show that combination therapy of docetaxel with NFkB inhibition does not further treat advanced thyroid cancer. These data indicate that the combination of NFkB inhibition and docetaxel is an attractive therapy for advanced thyroid cancer.

Abstracts

Berlin Nicholas

Project Title: Digit replantation in children: a nationwide analysis of outcomes and trends of 455 pediatric patients.

Thematic Area: Public Health and Epidemiology

Abstract: Background: The short-term outcomes of pediatric digit replantation have been derived primarily from single-center/surgeon experience. The purpose of this study was to conduct a nationwide analysis of outcomes and trends of pediatric digit replantation as compared to adult patients. Methods: Digit replantation patients were identified in the 1999–2011 Healthcare Cost and Utilization Project, Nationwide Inpatient Sample. Outcomes included in-hospital procedure-related and total complications, microvascular revision, amputation, and length of stay (LOS). Univariate and multivariate analyses were performed to compare pediatric and adult patients and to identify independent predictors of outcomes. The annual rate of replantation among pediatric digit amputation patients was evaluated over the study period. Results: A total of 3,010 patients who underwent digit replantation were identified, including 455 pediatric patients. For all replantations, age ≤ 18 years was associated with a lower likelihood of suffering a total complication (odds ratio (OR) 0.66, $P=0.006$), requiring amputation (OR 0.62, $P<0.001$), and experiencing LOS >5 days (OR 0.77, $P=0.019$), after adjusting for comorbidity, amputation severity, digit type, number of replantations, and hospital characteristics. Similar associations were observed between patient age and replantation outcomes for single-finger replantations. The rate of pediatric replantation (range 16 to 27 %) remained consistent through the study period (incidence rate ratio 0.98, $P=0.06$). Conclusions: The rate of pediatric replantation has been relatively low, being 27 % at most in a given year. Importantly, short-term outcomes are better in children than for adults, supporting the indication to perform replantation in this age group when the surgeon feels that replantation is feasible and safe.

Abstracts

McGuire Patsy

Project Title: Success of Hysteroscopic Sterilization in a Select Latina Population

Thematic Area: Clinical Research

Abstract: Objective: To determine the follow-up rate for post-Essure hysterosalpingogram (HSG) and success rate of hysteroscopic sterilization from June 2010 through December 2013 in a select Latina population that is mostly monolingual Spanish-speaking, undocumented, and uninsured. Setting: An urban Title X outpatient clinic that provides comprehensive gynecological and reproductive healthcare. The cost of the device, procedure, and follow-up HSG imaging visit was covered by a grant from an anonymous donor. Study design: Retrospective analysis of data from 197 patients who underwent hysteroscopic sterilization with Essure devices from June 2010 through December 2013. Results: Satisfactory bilateral insertion at first attempt was 93% (183/197). Of the 14 patients who were not successful, 8 subjects were offered a second attempt. After a second attempt, successful insertion rates was 96% (189/197). Two subjects did not return for a second attempt. One subject had bilateral insertion after three attempts. Overall, failure to place bilateral Essure coils was 3% (5/197). The follow-up rate for HSG testing in this select population was 89% (176/197). Bilateral tubal occlusion with hysterosalpingogram (HSG) following Essure placement was __% (__/176). One pregnancy was reported by the time of this publication. The percentage of women who never obtained their HSG and were lost to follow up was 11% (21/197). Conclusion: Based on the available data, the success rate of bilateral coil placement is consistent with that of the general population. The follow-up rate of this select Latina population is higher than that seen in comparable non-study clinic populations in urban settings and similar to rates seen amongst general non-Latina insured patients in the U.S.

Abstracts

Winston Helena

Project Title: Downstaging Disease in Patients with Hepatocellular Carcinoma Outside of Milan Criteria: Strategies Using Drug-eluting Bead Chemoembolization

Thematic Area: Clinical Research

Abstract: The published abstract is: "Purpose: To assess downstaging rates in patients with United Network for Organ Sharing stage T3N0M0 hepatocellular carcinoma(HCC) treated with doxorubicin-eluting bead transarterial chemoembolization to meet Milan criteria for transplantation. Materials and Methods: A single-center retrospective review of 239 patients treated with doxorubicin-eluting bead (DEB) chemoembolization between September 2008 and December 2011 was undertaken. Baseline and follow-up computed tomography or magnetic resonance imaging was assessed for response based on the longest enhancing axial dimension of each tumor (ie, modified Response Evaluation Criteria In Solid Tumors measurements), and medical records were reviewed. Fisher exact tests and exact logistic regression were used to test the association of patient and disease characteristics with downstaging. Conclusions: T3N0M0 HCC treatment with DEB chemoembolization has a high likelihood (77%) of downstaging the disease to meet Milan criteria.

Abstracts

Burneikis Dominykas

Project Title: Acid-Base Physiology (Chapter in: DHMC Handbook of Surgical Critical Care)

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: This is a handbook chapter on acid-base physiology. It is intended for residents and medical students taking care of critically ill surgical patients inside an intensive care unit. The chapter provides an overview of acid-base disturbances relevant to the surgical patient. It includes pertinent equations as well as sample problems that illustrate the most common conditions encountered in a surgical ICU.

Abstracts

Fauchet Geoffroy

Project Title: Physicians' Perceptions of Patient Safety Culture

Thematic Area: Public Health and Epidemiology

Abstract: Background Physicians are key stakeholders in patient safety initiatives but are often difficult to engage. There is little understanding of physicians' perceptions of safety culture to inform engagement strategies. Purpose To identify determinants of physicians' overall perceptions of patient safety culture. Methods We performed a cross-sectional study using the Hospital Survey on Patient Safety Culture (HSOPSC) 2012 database that contained 10,756 eligible physician respondents from 512 unique hospitals. Linear mixed models were used to assess the relationship between physician specialty, staff position, years worked in current specialty, and the 11 HSOPSC domains to the primary outcome, the percentage of positive response for the overall perception of patient safety domain. Results Intensivists had the highest percentage of positive responses for perception of patient safety culture (66%), while emergency medicine specialists had the lowest percentage of positive responses (52%). Resident physicians were not significantly different from attending physicians in their perception of patient safety culture ($p=0.88$). Physicians who had worked the shortest and longest times in their current specialty had the highest perception of patient safety ($p<0.01$). Responses in the organizational, communication, staffing, management, teamwork across units, and hospital handoffs dimensions were significantly associated with overall perceptions of patient safety ($p<0.01$). An intra-class correlation analysis suggested that variation across hospitals is not a significant factor. Conclusion Physician's perceptions of patient safety culture vary based on physician specialty and career stage. Efforts to engage physicians in patient safety initiatives should account for these differences and focus on important survey domains.

Abstracts

Bariteau Adam

Project Title: Characteristics and outcomes of in-flight and in-airport cardiac emergency patients: Denver International Airport's experience

Thematic Area: Clinical Research

Abstract: Background: There have been few studies over the course of the last four decades evaluating the treatments, outcomes, and characteristics of commercial airline passengers who suffer in-flight or in-airport medical emergencies that proceed to the activation of the EMS system. Furthermore, none of these studies have focused solely on any one particular etiology. Objectives: To report the incidence, post-flight treatments, outcomes, morbidity and mortality of patients suspected to have had a medical emergency of cardiac etiology. Methods: A 1-yr retrospective study from 2012 of emergency medical services (EMS), emergency department (ED), and inpatient hospital records of in-flight and in-airport medical emergency patients transported from Denver International Airport by a single transporting EMS agency was completed. All commercial passengers, or intended passengers, with in-flight or in-airport medical symptoms who activated the EMS system are included in the study. Outcome measures include in-flight sudden death of cardiac etiology, post-flight mortality, hospital admission rate, ICU admission rate, ED procedures, inpatient procedures, and discharge diagnoses. Results: There were 1110 total in-flight and in-airport medical emergencies activating the EMS system for transport during the study period, for an incidence of 20.9 per million passengers per year. In total, 61 of these presentations were due to a suspected cardiac etiology on retrospective chart review. The hospital admission rate in this group was 68.9%. The ICU admission rate was 19.7%. There were 3 in-flight or in-airport sudden deaths and 4 in-hospital deaths of cardiac origin for an overall mortality rate of 0.1 per million passengers and intended passengers per year. In total 5.5% of all in-flight and in-airport emergencies evaluated by EMS, and subsequently by the ED, were established to be cardiac in nature by discharge diagnosis. Conclusion: Medical emergencies of cardiac etiology had a diversity of presentations, the majority of which were chest pain, syncope or pre-syncope, and shortness of breath. The overall incidence of in-flight and in-airport medical emergencies of cardiac origin is small but potentially lethal and associated with a higher occurrence of hospitalization, morbidity, and mortality than other, non-cardiac emergencies.

Abstracts

Basel Paul Stephen

Project Title: The Effect of a Statewide Smoking Ordinance on Acute Myocardial Infarction Rates

Thematic Area: Public Health and Epidemiology

Abstract: **BACKGROUND:** Public smoking ordinances may reduce acute myocardial infarction events. Most studies assessed small communities with reported reductions as high as 40%. No reduction or smaller reductions were found in countrywide studies; less is known about the impact of statewide ordinances. We previously demonstrated identical 27% reductions in acute myocardial infarction hospitalizations in 2 Colorado communities after enactment of strict smoking ordinances. Subsequently, on July 1, 2006, a statewide ordinance went into effect. We sought to determine the impact of this legislation on acute myocardial infarction hospitalization rates. **METHODS:** Hospital admissions for a primary acute myocardial infarction diagnosis were examined from 2000 to 2008. Poisson regression models were fit to the monthly events from January 1, 2000, to March 31, 2008. The final model included a quadratic trend over time, harmonic terms, and a post-ordinance effect. The model was adjusted temporally for population changes, using population estimates as an offset variable. **RESULTS:** A total of 58,399 unique acute myocardial infarctions were recorded during the study period. No significant reduction in acute myocardial infarction rates was observed post-ordinance (relative risk, 1.059; 95% confidence interval, 0.993-1.131). However, a steep decline in acute myocardial infarction rates was noted from 2000 to 2005 just before enactment. There were 11 strict, local smoking ordinances in effect within Colorado before enactment of the statewide ordinance. After excluding these communities, the findings were similar (relative risk, 1.038; 95% confidence interval, 0.971-1.11). **CONCLUSIONS:** Although local smoking ordinances in Colorado previously suggested a reduction in acute myocardial infarction hospitalizations, no significant impact of smoke-free legislation was demonstrated at the state level, even after accounting for preexisting ordinances.

Abstracts

Rower Caitlin Sarah

Project Title: Development and Validation of a Method for the Determination of Intracellular Tenofovir-diphosphate and Emtricitabine-triphosphate Concentrations from Dried Blood Spots (DBS)

Thematic Area: Basic Science

Abstract: Adherence is a critical determinant of antiretroviral efficacy; however, there currently exists no quantitative adherence measure. Red blood cell (RBC) tenofovir-diphosphate (TFV-DP) and emtricitabine-triphosphate (FTC-TP) concentrations have shown promise as an objective pharmacological measure of recent and remote adherence. Clinical feasibility of a pharmacological method relies upon an inexpensive and accessible sample matrix, as well as the accurate and robust quantitation of drug from that matrix. This was accomplished with the determination of TFV-DP and FTC-TP concentrations from dried blood spots (DBS). Method validation and application are described. Concentrations were determined from 3mm DBS punches extracted into a 70:30 methanol:water solution. DBS samples were stable when spotted within an hour of blood draw, dried at room temperature for up to five days, stored at -20°C or -80°C for up to 36 months, and subjected to up to 5 freeze/thaw cycles. Quantitation was not impacted by patient hematocrits between 35-50%. Finally, we found that concentrations from DBS punches were analogous to those from purified RBC samples, and represented 11.9×10^6 RBC/punch. The described method has been applied to several HIV treatment and prophylaxis studies, demonstrating clinical utility for monitoring treatment adherence. The use of DBS for quantifying RBC TFV-DP and FTC-TP provides a simple, inexpensive, safe, and accurate pharmacologic measure with broad applicability to objectively determine remote and recent adherence to antiretroviral therapy.

Abstracts

McGarry Laurel Ruth

Project Title: Use and diversion of medical marijuana among adults admitted to inpatient psychiatry

Thematic Area: Public Health and Epidemiology

Abstract: Background: Marijuana use is associated with anxiety, depressive, psychotic, neurocognitive, and substance use disorders. Many US states are legalizing marijuana for medical uses. Objective: To determine the prevalence of medical marijuana use and diversion among psychiatric inpatients in Colorado. Methods: Some 623 participants (54.6% male) responded to an anonymous 15-item discharge survey that assessed age, gender, marijuana use, possession of a medical marijuana card, diversion of medical marijuana, perceived substance use problems, and effects of marijuana use. Univariate statistics were used to characterize participants and their responses. Chi-square tests assessed factors associated with medical marijuana registration. Results: Of the total number of respondents, 282 (47.6%) reported using marijuana in the last 12 months and 60 (15.1%) reported having a marijuana card. In comparison to survey respondents who denied having a medical marijuana card, those respondents with a medical marijuana card were more likely to have initiated use before the age of 25, to be male, to have used marijuana in the last 12 months, and to have used at least 20 days in the past month. 133 (24.1%) respondents reported that someone with a medical marijuana card had shared or sold medical marijuana to them; 24 (41.4%) of respondents with a medical marijuana card reported ever having shared or sold their medical marijuana. Conclusion: Medical marijuana use is much more prevalent among adults hospitalized with a psychiatric emergency than in the general population; diversion is common. Further studies which correlate amount, dose, duration, and strain of use with particular psychiatric disorders are needed.

Abstracts

Kolnik Adam

Project Title: Evaluation of the Impact of Required vs. Non-Required Student Scholarly Concentration

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Background: Student scholarship, defined as student-driven research or similar scholarly activity, has long been a component of undergraduate medical education. In recent years there has been an increased focus on required scholarly work during medical school, with many institutions now requiring completion of such work for graduation. Problem: The degree to which scholarly activity during undergraduate medical education, required or not, impacts students has yet to be evaluated. Methods: Residents of the various University of Colorado residency programs will be surveyed to measure the impact of scholarship and research experiences in several domains, including knowledge gained, mentoring relationships, self-reported quality and importance of the research experiences, career decisions, and continued interest and involvement in scholarship and research. Survey participants will be categorized according to whether or not scholarship was a required component of medical school for graduation, and survey responses will be compared in these two groups. Personal characteristics, pre-medical school research interests and experience and residency program characteristics will also be assessed to permit adjustment for possible confounding factors. Results: Not yet available Implications: This study will provide important information about the impact of required scholarship activities in medical schools. Such information may help medical school administrators, curriculum leaders, residency program directors and students themselves to determine whether continued program development and investments in these programs are warranted.

Abstracts

Lancaster Brian

Project Title: Evaluation of the Impact of Required vs Non-Required Student Scholarly Concentration

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Background: Student scholarship, defined as student-driven research or similar scholarly activity, has long been a component of undergraduate medical education. In recent years there has been an increased focus on required scholarly work during medical school, with many institutions now requiring completion of such work for graduation. Problem: The degree to which scholarly activity during undergraduate medical education, required or not, impacts students has yet to be evaluated. Methods: Residents of the various University of Colorado residency programs will be surveyed to measure the impact of scholarship and research experiences in several domains, including knowledge gained, mentoring relationships, self-reported quality and importance of the research experiences, career decisions, and continued interest and involvement in scholarship and research. Survey participants will be categorized according to whether or not scholarship was a required component of medical school for graduation, and survey responses will be compared in these two groups. Demographic and personal characteristics, pre-medical school research interests and experience and residency program characteristics will also be assessed to permit adjustment for possible confounding factors. Results: Not yet available Implications: This study will provide important information about the impact of required scholarship activities in medical schools. Such information may help medical school administrators, curriculum leaders, residency program directors and students themselves to determine whether continued program development and investments in these programs are warranted.

Abstracts

Gallegos Danielle Renae

Project Title: Prevalence of Spinal Cord Tethering by MRI in Infants with Sacral Dimples

Thematic Area: Clinical Research

Abstract: ABSTRACT: Objective: To identify the prevalence of spinal cord tethering associated with various skin stigmata or congenital anomalies. Methods: Retrospective study of 528 infants under the age of one years old who underwent lumbar MRI imaging from September 2006-Septemeber 2012. Review of EMR data including indication for imaging, imaging results, referring provider, and surgery details were included. In addition, in a sub-set of patients US and MRI were correlated. Results: 522 patients were identified who had lumbar MRI done to evaluate for tethered spinal cord over 6 consecutive years. The most common indication for imaging was the presence of a sacral dimple, with an actual tethering rate of 20%. The highest rate of tethering were patients with cutaneous markers other than a dimple (55%), a deviated gluteal cleft (28% tethered), congenital anomalies (36% tethered), and those with multiple cutaneous abnormalities (27% tethered). Non-dimple cutaneous markers were shown to have the highest rate of severely tethered abnormalities. There was no significant association between dimple location and tethering. Conclusion: The presence of multiple cutaneous lesions, congenital anomalies, or isolated non-dimple cutaneous markers are more likely to yield tethered cord pathology, and often severe abnormalities. Patients with these specific types of abnormalities should have MRI done as first line imaging. Isolated midline sacral dimples, hemangiomas, and deviated gluteal folds have a low correlation with predicting tethered cord and would benefit from primary ultrasound. MRI should also be used to confirm equivocal ultrasound findings, or in the presence of clinical symptoms of tethered cord syndrome.

Abstracts

Petrun Branden M

Project Title: Disseminated Varicella-Zoster Virus in an Immunocompetent Adult

Thematic Area: Clinical Research

Abstract: Varicella-zoster is the virus that causes varicella (chicken pox), herpes zoster (shingles), and, rarely, severe disseminated disease including diffuse rash, encephalitis, hepatitis, and pneumonitis. Disseminated disease is most often seen in immunocompromised patients. We describe a case of disseminated zoster in an immunocompetent patient who had previously been immune to VZV. This case is also unusual in that his clinical presentation was most consistent with varicella while his laboratory data was most consistent with herpes zoster. For the purpose of rapid diagnosis and initiation of appropriate therapy, clinicians should be aware of these more atypical presentations of VZV infection.

Abstracts

Petersen Eric

Project Title: A pilot study in anticipation of space surgery: Does acclimation time to a simulated microgravity environment affect laparoscopic skill?

Thematic Area: Clinical Research

Abstract: Background: Laparoscopic surgery is a potential candidate for use in long-term space missions as well as Mars colonization. 0-g tests on parabolic aircraft have demonstrated the feasibility of laparoscopic surgery in microgravity but at the cost of increased effort and decreased accuracy. Parabolic flight, while a great test bed for microgravity research, provides short half-minute exposures to 0-g and can be hard on the physician being studied. This pilot study was carried out to determine if the decreases in laparoscopic skills associated with a change in acceleration were confounded by short acclimation times to microgravity. Methods: 4 experienced, Scuba certified general surgeons comfortable with minimally invasive surgery were recruited to participate in the study. They were randomized into a land-to-water or water-to-land group where they were equipped with scuba gear and given 5 minutes to acclimate to the iPad-based laparoscopic trainer. After the acclimation time, their times and scores for the established FLS skills of patern cut, ligating loop, and suture with intracorporeal knot tie were recorded on five subsequent attempts. The data were analyzed with a task completion time over time and task accuracy over time plots, descriptive statistics, and a Student's T-Test. Results: TBD - Undergoing COMIRB Full Review Conclusion: With adequate acclimation time, laparoscopic skills are not significantly affected by changes in apparent gravity. Further testing on the International Space Station would be the most accurate test of microgravity on laparoscopic skill.

Abstracts

Cutter Christina Marie

Project Title: Geographic distribution and injury severity of penetrating trauma in Cape Town, South Africa

Thematic Area: Global Health

Abstract: Injury is the leading cause of mortality in the Western Cape Province of South Africa. Sharp penetrating trauma significantly contributes to the regional injury burden. A retrospective cohort study was performed to describe the geographic distribution and injury severity patterns of sharp penetrating trauma in Cape Town. A cluster analysis using the geographic location of injury was conducted to identify injury clusters by proximity and injury rate. Univariate analyses were performed to evaluate the association between injury clusters and injury severity metrics. The analytic cohort was comprised of 796 patients. Spatial analysis revealed three geographic clusters ($P < .001$) with high rates of violent stab injury. Patients originating in non-clustered main place areas were more likely to receive an immediate priority cape triage score (CTS), to undergo surgery, to require blood transfusions, and to experience mortality. This study identified three areas of geographic clustering of high rates of violent stab injury in Cape Town, South Africa. These findings may serve as a resource for injury prevention targeting efforts. Additionally, the results indicate an inverse association between main place cluster status and injury severity metrics. The implications of this association must be considered in the design of future trauma surveillance systems.

Abstracts

Eichengreen Courtney Alyn

Project Title: Rectal perforation with an intrauterine device: a case report

Thematic Area: Clinical Research

Abstract: A 27-year-old woman presented for routine examination 1 year after intrauterine device (IUD) placement; strings were not visualized. The device was found to be penetrating through the rectal mucosa. It was removed easily through the rectum during an examination under anesthesia. Perforated IUDs with rectal involvement require thoughtful surgical planning to optimize outcome

Abstracts

Elison David Miles

Project Title: Think Like a Doctor: An Innovative Curriculum for High School Students Designed to Foster Critical Thinking Skills and Increase Interest in Careers in Medicine

Thematic Area: Clinical Research

Abstract: This curriculum is composed of three modules, each designed to have priming material, group work, self-directed learning and a hands-on practicum. Priming material in each module is typically a didactic lecture and hands-on activity to help identify key anatomy and physiology involved in that module. Group work utilizes an inquiry-based education style “case presentation” where students review a case and decide on a self-directed learning goal to research on their own. Each module concludes with a real world experiential activity where students learn a new clinical skill. Student knowledge is assessed using learning issue reports and an end of module quiz. The didactic portions of the curriculum have been kept to minimum to provide the students sufficient time to complete the exercises in each component of the module. We feel that a hands-on, problem centered approach is an optimal learning format to impact student attitudes regarding pursuing careers in healthcare.

Abstracts

Rodriguez Aldeboran Noel

Project Title: Characterization of a Novel Obstetric Communication Assessment Tool for Undergraduate Medical Education

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Study Objective: Characterize the psychometric properties of an Obstetric Communication Assessment Tool (OCAT) for a novel OB communication module. Methods: We developed four difficult OB Standardized Patient (SP) scenarios: Religious Beliefs (RB), Angry Father (AF), Maternal Smoking (MS), and Intimate Partner Violence (IPV). A trial run was performed with SPs and twenty-one third year OB/GYN clerkship students. Five trained Standardized Patient Reviewers (SPRs) independently scored twenty-four randomized video-recorded encounters. Internal consistency (IC) was estimated with Cronbach's alpha. Inter-rater reliability (IRR) was estimated using the Intraclass Correlation Coefficient-2 (ICC-2) test. Systematic variability in reviewer responses was assessed using the Stuart-Maxwell test. Results: IC was acceptable to excellent with alpha values (and 95% Confidence Intervals [CI]): RB 0.91 (0.86, 0.95), AF 0.76 (0.62, 0.87), MS 0.91 (0.86, 0.95), and IPV 0.94 (0.91, 0.97). IRR was unacceptable with ICC-2: RB 0.46 (0.40, 0.53), AF 0.48 (0.41, 0.54), MS 0.52 (0.45, 0.58), and IPV 0.67 (0.61, 0.72). Stuart-Maxwell analysis indicated systematic variability in reviewer scoring. Conclusions: We have developed the OCAT with high IC but unacceptable IRR. Our findings suggest that the OCAT effectively discriminates learner performance but systematic differences in SPR rigor require a revised training regimen to improve reliability. Dedicated OB communication training is lacking, despite the wealth of uniquely sensitive and difficult clinical topics unaddressed by conventional communication curricula. We propose the optimization of the OCAT as an essential step toward development of a focused OB communication module and discuss future directions of the project.

Abstracts

Mehner Lauren

Project Title: Developmental Screening to Inform an Early Childhood Development Program in Southwest Guatemala

Thematic Area: Global Health

Abstract: Developmental Screening and an Early Childhood Care and Development Program in Southwest Guatemala Purpose: The importance of interventions to improve early childhood development, health, and nutrition is widely recognized at an international level. Such interventions have the potential to enhance a child's physical growth, socioemotional, and cognitive development, as well as the overall economic productivity of a society. The purpose of this research was to conduct a baseline developmental screening assessment of children in a poor region of southwestern Guatemala and to evaluate an early childhood care and development program specifically designed for this population. Methods: Developmental screening was conducted by Guatemalan community health workers using Spanish age-appropriate versions of the Ages and Stages Questionnaire (ASQ), a developmental screening tool for children aged 12-48 months, to assess five domains (gross motor, fine motor, communication, personal-social, and problem solving). Surveys that examined demographic information and family behaviors were also completed for each participant. Early childhood education materials from the Colorado Bright Beginnings Program were adapted and used to create two 30-page flipchart talks to educate mothers on nutritional, health, and developmental topics relevant to 12-24-month-olds and 24-48-month-olds. Trained local community health workers performed the 20-minute talks one-on-one with the mothers. A post-survey was given two weeks after the intervention. All participants were given an age-appropriate picture book. Results: Demographic/behavioral surveys, ASQ developmental screening forms, and educational flipchart talks were completed with 75 mothers. Mean annual family income was US\$1697 (\$4.65 per day). Approximately 36% of mothers were illiterate and 32% of mothers had not received any primary education. 60% of children had a screening delay in at least one ASQ category and 39% of children had a delay in at least two categories, with fine motor (47% with a delay) and problem solving (32% with a delay) having the most delays. Specific maternal characteristics (illiteracy, no primary education, and four or more pregnancies) were significantly associated with having two or more ASQ delays ($p < 0.05$). Children performed best in the communication category (8% with a delay). Certain maternal-child interactive behaviors (plays together with toys and converses when feeding) were significantly associated with fewer ASQ communication delays ($p < 0.05$). Follow-up post-surveys were completed by 62 mothers, with over 90% saying that after the intervention they increased the amount of time they spent talking, playing, and using a picture book with their child. Conclusion: Children in the southwestern region of Guatemala were found to have high rates of ASQ defined developmental delays and could benefit from an intervention that integrates ways to promote early childhood development, health, and nutrition.

Abstracts

McLeroy Robert Dustin

Project Title: Current Evidence and Recommendations in the Management of Severe Sepsis and Septic Shock

Thematic Area: Clinical Research

Abstract: Severe sepsis and septic shock have a significant economic impact of \$14 billion annually in the U.S. and mortality rate that can exceed 50% if not identified and treated promptly.^{7, 13} As sepsis has a substantial impact, many investigators in the field of critical care medicine have sought a better way to treat this disease. Prior to the publication of Rivers and colleagues EGDT study in 2001, most treatments were based on opinion and experience rather than clinical trials. This landmark study showed an absolute risk reduction of 15.9% in 28 day mortality rate in using EGDT which was based on goals of reaching certain physiologic endpoints as a guide to resuscitation.⁴ The “resuscitation bundles” utilized in Rivers study were adopted by the Surviving Sepsis Campaign as Standard of Care for sepsis.¹⁶ This was done before more robust, multicenter randomized controlled trials had been performed to validate the results of Rivers et. al. single-center trial. The large, multicenter ProCESS and ARISE trials published in 2014 established that EGDT was not superior to usual care.^{17, 18} This demonstrates that early identification and volume resuscitation is mainstay in the treatment of individuals with septic shock; however, EGDT may not be essential. Abbreviations: EGDT- “Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock”; ProCESS- “A Randomized Trial of Protocol-Based Care for Early Septic Shock”; ARISE- Australasian Resuscitation in Sepsis Evaluation

Abstracts

Murphy David Lee

Project Title: Comparative Rates of Mortality and Severe Medical Effect Among Commonly Prescribed Opioid Analgesics: Calls to US Poison Centers Reporting Opioid Overdose Due to Intentional Abuse and Misuse Exposures

Thematic Area: Public Health and Epidemiology

Abstract: Background: Misuse and abuse of prescription opioids in the U.S. has reached epidemic proportions and places significant burden on emergency departments. While prescription opioids are effective for pain management, several significant adverse associations exist including abuse, dependence, addiction, healthcare costs, and death. Mortality from prescription opioid overdose is the leading cause of accidental death in most U.S. states. While it is commonly presumed that increasing potency among opioid analgesics is linked to higher rates of adverse outcomes, this claim has not been substantiated. Objectives: To compare the rate of death or major medical effect for commonly prescribed opioid analgesics due to abuse and misuse. Methods: Intentional abuse and misuse exposures were collected by the RADARS® System Poison Center Program, a database of surveillance information from poison centers across the U.S., from January 2010 through June 2014. Death and major medical effects, classified according to AAPCC guidelines, were recorded for tablets containing six commonly prescribed opioid analgesics: oxycodone, hydrocodone, morphine, hydromorphone, oxymorphone, and tramadol. Primary outcome was defined as the rate of death or major medical effect. Amount of drug dispensed nationally was obtained from IMS Health. Outcome rate per 100,000 grams dispensed was regressed on morphine milligram equivalents (MME). For each opioid analgesic, the number needed to harm (NNH) was derived. Results: We identified 11,380 calls. Rate of primary outcome per MME and NNH are reported for each opioid (Table). For each 1 unit change in MME, an increase of 1.7 cases of death or major medical effect are reported to poison centers per 100 kilograms drug dispensed ($p=0.004$). Linear regression (Figure) identified 89% of the variation observed was due to MME and was supported by additional sensitivity analyses. Conclusion: Potency of a prescription opioid analgesic demonstrates a significant, highly positive linear relationship with death or major medical effect reported to poison centers. It is unknown whether the drug or the associated abuse behaviors ultimately cause death, but prescribers can select opioids with lower rates of associated major health outcomes. Such mindfulness when selecting opioid analgesics may contribute to decreasing severe adverse effects and mortality due to opioid overdose.

Abstracts

Stoll Daniel Muir

Project Title: Improving Transitions of Care for Uninsured Patients at the University of Colorado Hospital

Thematic Area: Clinical Research

Abstract: Facilitating transitions of care for uninsured hospitalized patients is a challenge encountered by inpatient medical services nationwide. At University of Colorado Hospital (UCH) nearly 30% of medical inpatients are uninsured, many of whom have no established outpatient medical care. A previous study at UCH showed only 29% of uninsured patients have timely primary care follow up after hospital discharge, compared to 56% of insured patients. Patients who lack timely access to outpatient medical care may be at significantly higher risk of poor outcomes and higher rates of resource utilization. Many medical patients have time-sensitive follow up needs, such as repeat lab studies and physical examination; discharge may be delayed if appointments are not secured in an appropriate time frame. The resulting increased length of stay adds to healthcare costs and unnecessary hospital exposure. We hypothesize that improving access to post-hospitalization follow-up will decrease rates of emergency room visits and readmissions, and potentially the cost of the index hospitalization through decreased length of stay. In the fall of 2011, UCH instituted a program of Patient-Resident Liaisons (PRLs) to provide personnel to meet a variety of patient and hospital needs, including assistance in coordinating outpatient follow up. We began with an analysis of all uninsured patients admitted to teaching medicine teams at UCH, both prior to, and following, the initiation of the PRL program. We collected data on length of stay, rates of follow-up, readmissions, and subsequent emergency department visits. Our data analyses showed that prior to initiation of the PRLs, only 24% of uninsured patients discharged from medicine teaching services had established follow up appointments through the community health clinics, compared to 70% following this intervention. Additionally, our data showed a dramatic decrease in hospital readmission rates: from 16% to 9% at 30 days, and from 24% to 14% at 90 days, following the PRL intervention. Despite these promising statistics, preliminary data obtained from community clinics indicates that although many patients are now discharged with scheduled follow up appointments, only a subset of these appointments are actually attended. Attendance rates varied greatly among different clinics, in the range of 20% to 80%. It is hypothesized that barriers to appointment attendance include many factors, such as cost of fees and co-pays, transportation, and lack of health literacy regarding the importance and purpose of preventative medicine. The disparity of show rates among different clinics is not clearly understood at this time. Future efforts may focus on surveying patients to formally identify the most problematic barriers, in order to focus and guide future interventions, as well as to further qualify and quantify the PRL data noted above.

Abstracts

Johnson Charles Albert

Project Title: Characterization of excimer laser plume particles

Thematic Area: Basic Science

Abstract: The aim of our study was to characterize the contents and inflammatory potential of excimer laser plume particulate generated during phototherapeutic keratectomy. A novel method to capture soluble plume particulate media for subsequent characterization by micro-flow analysis was designed and herein described. An ELISA test was used to analyze the levels of interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF α), well-characterized pro-inflammatory cytokines, released from RAW 264.7 cells exposed to plume particulate in complete cell media. Results were compared with those following exposure to complete cell media, air-filtered media, and LPS media controls. Media containing plume particulate and filtered air did not induce a pro-inflammatory response from RAW 264.7 cells and was statistically different from the levels of IL-6 and TNF α released in response to control media containing LPS. Micro-flow imaging analysis provided a rapid method for analysis of particulate in media samples.

Abstracts

Li Rosie Qing

Project Title: Safety of low-dose intravenous heparin for VTE prophylaxis in the presence of epidural analgesia

Thematic Area: Clinical Research

Abstract: Safety of low-dose intravenous heparin for VTE prophylaxis in the presence of epidural analgesia Rosie Li¹, Andrea Fuller¹, Nathan Perlman², Martin McCarter², Csaba Gajdos², Christine Hamiel¹, Angela Baer¹, Elizabeth Luzier¹, Zung Cu Tran³, Paul Wischmeyer¹, Sara S Cheng¹ 1. Department of Anesthesiology, University of Colorado School of Medicine 2. Department of Surgery, University of Colorado School of Medicine 3. Department of Preventive Medicine and Biometrics, University of Colorado School of Medicine

Introduction: Epidural hematoma is a much-feared complication of epidural analgesia in the presence of anticoagulation, with an estimated incidence of 1:4500 to 1:100,000 depending on patient population. Post-surgical deep venous thrombosis prophylaxis with subcutaneous heparin is commonly used in the presence of epidural analgesia and is not contraindicated, according to American Society for Regional Anesthesia guidelines. However, little is known about the safety of low dose intravenous heparin administered for prophylactic purposes. We report a comparison of subcutaneous versus intravenous heparin infusion for the prevention of deep venous thrombosis in the presence of epidural analgesia. **Methods:** We conducted a posthoc analysis of a study on major abdominal surgery patients with thoracic epidural catheters placed for postoperative pain control. This study was approved by the local IRB. We assessed differences in coagulation status and outcomes in patients receiving two types of VTE prophylaxis: subcutaneous unfractionated heparin, or low-dose heparin infusion titrated to an aPTT of 40-50 seconds. Included were patients 18 years and older admitted to the surgical intensive care unit directly after surgery. No patients received VTE prophylaxis after hospital discharge. Sonoclot analysis was conducted prior to surgical incision on day 0 and daily for 5 days after surgery. Patients were followed for 6 months for the dependent variable of symptomatic VTE. **Results:** We identified 71 patients who had a thoracic epidural placed for postoperative pain. 51% (n = 36) received IV heparin and 49% (n = 35) received SQ heparin. The number of cases that had an aPTT more than the upper limit of normal (33.5 seconds) was 33 patients in the IVH group (92%) versus 7 in the SQH group (20%) (p<0.0001). Patients in both groups showed no signs of coagulation dysfunction, as evidenced by normal Sonoclot clot rate and activated clotting time. There were no cases of neuraxial bleeding. 6-month followup was completed in 100 % of patients. 17 % developed symptomatic VTE within 6 months, and this proportion was not affected by inpatient prophylaxis regimen. **Conclusions:** There are not enough patients in our study to definitively state that epidural hematoma is not associated with low-dose IV heparin administration. In this small study, viscoelastic clotting tests suggest that subcutaneous and intravenously administered prophylactic heparin do not cause significant anticoagulant changes

after major abdominal surgery. Further studies need to be done to investigate the safety profile of intravenous prophylactic heparin in the presence of epidural analgesia.

Abstracts

Schiller Georgia Jean

Project Title: Safety of first-trimester uterine evacuation in the out-patient setting for women with common chronic conditions

Thematic Area: Clinical Research

Abstract: Objective: Provider concerns over women's baseline medical conditions may limit abortion access. We compared complications of outpatient first-trimester uterine evacuation between women with medical comorbidities and healthy peers. Study Design: We examined the medical histories and procedure outcomes of women receiving first-trimester uterine evacuations between 01/02/2009-03/07/2014. We compared women without medical problems to those reporting diabetes, hypertension, obesity (body mass index ≥ 30 or weight ≥ 200 lbs), HIV, epilepsy, asthma, thyroid disease, and/or bleeding/clotting disorders. We compared incidence of any of the following: resuction, uterine perforation, estimated blood loss >100 cc, and cervical laceration. Results: A total of 1,960 women met inclusion criteria; 597 (30%) had ≥ 1 comorbidity. When compared to women without medical morbidities, women with common chronic conditions were older (28.3 ± 6.7 vs. 27.3 ± 6.7 years, $p < 0.01$), less likely to be primigravid (29.1% vs. 35.7%, $p = 0.005$), and more likely to have had a prior cesarean (24.9% vs. 15.7%, $p < 0.001$) than their peers. Gestational age and indication for evacuation were similar for the groups. The overall complication rate was 2.9% and there was no difference between all comorbidities compared to none (OR=0.9, 95% CI 0.5, 1.6), or between each specific morbidity and none. The only significant predictor of complication was history of cesarean delivery (OR=1.9, 95% CI 1.1, 3.4). Conclusion: Women with common chronic conditions undergoing outpatient first trimester uterine evacuation do not appear to be at greater risk of complications compared to healthy peers. While a careful medical history is always required, providers may feel reassured that complications remain rare.

Abstracts

Montano Aaron Cruz

Project Title: Viral Gastroenteritis in Children in Colorado: 2006-2009

Thematic Area: Public Health and Epidemiology

Abstract: Acute gastroenteritis accounts for a significant burden of medically attended illness in children under the age of five. For this study, four multiplex reverse transcription PCR assays were used to determine the incidence of adenovirus, astrovirus, coronavirus, norovirus GI and GII, rotavirus, and sapovirus in stool samples submitted for viral electron microscopy (EM) to the Children's Hospital Colorado. Of 1105 stool samples available, viral RNA/DNA was detected in 247 (26.2%) of 941 pediatric samples (median age $\frac{1}{2}$ 2.97 years, 54% male) with 28 (3.0%) positive for more than one virus. Adenovirus, astrovirus, norovirus GI, norovirus GII, rotavirus, and sapovirus were detected in 95 (10.0%), 33 (3.5%), 8 (0.9%), 90 (9.6%), 49 (5.2%), and 2 (0.2%) of the pediatric samples, respectively. No coronaviruses were identified. Sequencing of norovirus positive samples indicated an outbreak of norovirus strain GII.4 in 2006 with evidence of numerous circulating strains. Multiple samples from the same immunocompromised patients demonstrated symptomatic shedding of norovirus for up to 32 weeks and astrovirus for 12 weeks. RT-PCR detected 99 of 111 (89%) adenovirus-positive samples vs. 12 (11%) by EM, and 186 of 192 (97%) sapovirus/astrovirus/ norovirus-positive samples vs. 21 (11%) by EM. Noroviruses and adenoviruses are common causes of gastroenteritis in children. Immunocompromised patients can be infected with multiple viruses and shed viruses in their stools for prolonged periods. This data support the superiority of RT-PCR compared to EM for diagnosis of viral gastroenteritis. *J. Med. Virol.* 9999: XX–XX, 2014.

Abstracts

Evans Meredith Toon

Project Title: Culinary Medicine

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: It has been well established in the literature that there is a substantial lack of nutrition education in the curriculums of US medical schools. This gap in essential knowledge among physicians trickles down to our patient care in the form of little to no adequate or applicable nutrition counseling. With the rising percentage of Americans suffering from obesity and diet-related diseases it is becoming more and more important for physicians to be well prepared to effectively counsel patients with a variety of chronic diseases and dietary needs. A culinary medicine program aims to provide future physicians with hands-on experience and knowledge of nutrition and culinary techniques that can then be applied directly to patient counseling. The Goldring Center for Culinary Medicine was initially founded at Tulane University School of Medicine with the goal of enhancing the education of medical students, physicians and the community. In collaboration with Tulane University and Denver Johnson & Wales University, a culinary medicine program has been initiated at the University of Colorado School of Medicine. In addition to surveying all medical students regarding their knowledge and attitudes towards health and nutrition, this program includes an elective course for first and second year medical students. This elective involves first and second year medical students working with culinary students to prepare meals in the kitchen, discuss the nutritional content and other aspects of the meals, as well as how a physician might counsel a patient with specific nutrition-related diseases or dietary needs. Over time, the hope is that this program will provide future physicians with essential knowledge and confidence to care for patients with diet-related diseases.

Abstracts

Habermehl Gabriel Kyle

Project Title: Seroincidence and Immune Correlates of Rotavirus Infection in High-Risk HIV-1-Exposed Uninfected Breastfed Infants in Uganda.

Thematic Area: Basic Science

Abstract: Background. Rotavirus (RV) is a leading cause of morbidity and death in infants in sub-Saharan Africa. We determined the seroincidence and correlates of RV infection in HIV-1-exposed but uninfected (HEU) infants in the first year of life in Uganda prior to the introduction of rotavirus vaccine. Methods. We followed 100 HIV-1-infected mothers and their breastfed HEU infants at birth, 6, 12, 18, 24 and 48 weeks. We identified natural RV infection with RV-specific IgA and IgG (RV-IgA/IgG) in serum and breast milk (BM) by ELISA, total IgA and IgG by nephelometry. We measured RV-IgA in 14 healthy U.S. infants given oral RV vaccine at birth, 8, 16 and 24 weeks. Results. RV-IgG, but not RV-IgA, was detectable in all infants at birth in both cohorts (median 85% transplacental transfer in HEU). In Uganda, RV-IgA seroconversion began before 6 weeks, the seroincidence peaked at 18-24 weeks and 75.8% showed RV-IgA by 48 weeks. At 24 and 48 weeks, levels of RV-IgA were higher in vaccinated US infants than in those naturally-infected in Uganda. In Uganda, RV seroincidence in weeks 0-12 was associated with decreased RV-IgG at birth, as was RV-IgA in breast milk in the 18-24 week period. Conclusions. Despite exclusive breastfeeding, infant RV infection begins early in life in Uganda, peaks at the time of weaning and most infants are infected by 48 weeks. RV-IgA in BM was associated with protection against infant seroconversion at the time of highest incidence. Early immunization may limit these infections in high-risk Ugandan infants.

Abstracts

Howard Kenton

Project Title: Intercellular Adhesion Molecule 1 (ICAM-1) Mediates Murine Colon Adenocarcinoma Invasion

Thematic Area: Basic Science

Abstract: Background: Intercellular adhesion molecule-1 (ICAM-1) modulates cell-cell adhesion and is a receptor for cognate ligands on leukocytes. Upregulation of ICAM-1 has been demonstrated in malignant transformation of adenomas and is associated with poor prognosis for many malignancies. ICAM-1 is upregulated on the invasive front of pancreatic metastases and melanomas. These data suggest that the upregulated ICAM-1 expression promotes malignant progression. We hypothesize that the downregulation of ICAM-1 will mitigate tumor progression. Methods: Mouse colon adenocarcinoma cells (MC38) were evaluated for the expression of ICAM-1 using Western immunoblot analysis. Short hairpin RNA (shRNA) transduction was used to downregulate ICAM-1. Tumor invasion determined via a modified Boyden chamber was used as a surrogate of tumor progression examining MC38 cells, MC38 ICAM-1 knockdowns, and MC38 transduced with vehicle control. The cells were cultured in full media for 24 h and serum-starved for 24 h. A total of 5 × 10⁴ cells were plated and allowed to migrate for 24 h using full media with 10% fetal bovine serum as a chemoattractant. Inserts were fixed and stained with crystal violet. Blinded investigators counted the cells using a stereomicroscope. Statistical analysis was performed by analysis of variance with Fischer protected least significant difference and a P value of <0.05 was considered statistically significant. Results: ICAM-1 was constitutively expressed on MC38 cells. Transduction with anti-ICAM-1 shRNA vector downregulated ICAM-1 protein expression by 30% according to the Western blot analysis (P < 0.03) and decreased ICAM-1 messenger RNA expression by 70% according to the reverse transcription-polymerase chain reaction. shRNA knockdown cells had a significant reduction in invasion >45% (P < 0.03). There were no significant differences between the invasion rates of MC38 and MC38 vehicle controls. Conclusions: Downregulation of ICAM-1 mitigates MC38 invasion. These data suggest that targeted downregulation of tumor ICAM-1 is a potential therapeutic target.

Abstracts

Castaneda Garland

Project Title: CU Peru Operations Manual

Thematic Area: Global Health

Abstract: CU Peru is a 501(c)3 student-run nonprofit based on the Anschutz Medical Campus that is open to all types of students on campus. This manual is a detailed explanation of and guide to everything that CU Peru does both in Colorado as well as Peru. This includes the organization of leadership and committees, interaction with outside groups, an overview of the Loreto region and Peruvian healthcare, the group's community health worker training sessions and village visits, fundraising and finances, and member responsibilities.

Abstracts

Schwan Josianna Virginia

Project Title: A Gamma Secretase Inhibitor Synergistically Kills Melanoma Cells with ABT-737/ABT-263 through a Noxa-Dependent Mechanism

Thematic Area: Basic Science

Abstract: Despite the recent promising development of melanoma therapies targeting BRAF/MEK signaling, many patients relapse or don't respond to these treatments due to lack of the specific mutations targeted by these treatments. Thus, developing other treatment options is still urgent for melanoma. Targeting Bcl-2 anti-apoptotic proteins, such as the small molecule ABT-737, has been actively investigated for melanoma treatments. However, ABT-737 alone is not very effective in killing melanoma cells: many tumors also rely on other Bcl-2 proteins, such as Mcl-1, whose over-expression can contribute to cell resistance to ABT-737 therapy. The induction of Noxa, which selectively inhibits Mcl-1, is able to overcome this resistance. Gamma Secretase Inhibitors (GSIs) have been shown to induce apoptosis in malignant melanoma cells through induction of Noxa. Thus, in the present study, we tested the effects of the combination of ABT-737 with Gamma Secretase Inhibitors (GSI) on malignant melanoma cells. After 48 hours of combination treatment, we used MTS and Immunoblot assays to assess for apoptosis. We also used Noxa and Mcl-1 protein Immunoblot assays to determine each protein's expression after treatment. We then examined whether Mcl-1 or Noxa plays a role in the induced killing by using shRNAs against each protein in multiple melanoma cell lines and assessing treatment response. Additionally, we re-assessed the effects using GSI and ABT-263, the bioactive equivalent of ABT-737. We found that the combination of ABT-737 with GSI strongly induced apoptosis, more than either drug alone, in multiple melanoma cell lines, but not normal melanocytes. Additionally, the combination dramatically induced Noxa/Mcl-1 ratio, while as knocking down Mcl-1 sensitized cells to ABT-737 and knocking down Noxa protected cells from the combination treatment. Furthermore, the combination of GSI with ABT-263 induced Noxa-dependent killing of melanoma cells, very similarly to the combination of ABT-737 and GSI. Overall, our data suggests the combination of ABT-737/ABT263 with GSI is a promising treatment strategy, worthy of further investigation.

Abstracts

Dyer Julie Rae

Project Title: Developing a culture of quantitative data collection to enable quality improvement projects for the Healthy Beginnings Clinic at Warren Village

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Introduction: The Healthy Beginnings Clinic, which was established in 1998, is a student-run, free pediatric clinic for the residents of Warren Village. As a 501(c)(3) non-profit organization, Warren Village provides housing services to low-income, single parent families as well as training programs for residents to become self-sufficient economically and personally. The clinic originated out of the desire of medical students to apply medical skills while working closely with urban, underserved populations in Denver. Medical students volunteering at the clinic do so through an elective at the University of Colorado School of Medicine and are supervised at clinic by upper classmen and attending physicians from the community. Clinic is held each Wednesday, with the exception of holidays, at the Ray Cushman house of Warren Village. Patients sign up for clinic slots throughout the week. Both well child checks and sick visits are welcomed. Students are trained on the full pediatric physical exam and become skilled in writing patient notes and presenting patients to attending physicians. Moreover, students gain experience administering vaccinations during designated vaccine nights. While the clinic has been a prominent feature of Warren Village for 16 years, the clinic itself is lagging with regards to routinely collecting data on services provided. Without this baseline culture of data collection, quality improvement projects are not occurring and thus interventions are not being implemented which could better both the quality of services provided and the efficiency of the clinic. While the clinic operates through grant awards, the student managers are not equipped with the ability to report clinic achievements and detail new projects without baseline data.

Methods: Quantitative data on the services provided, demographics of the patient population, and data on the students, student steering committee members and attending physicians who participate will be collected routinely at the clinic. All data will be de-identified and stored in a secure, web-based server through the University of Colorado, entitled REDCap. Two of the student managers will be conducting this project as part of their Mentored Scholarly Activity through the School of Medicine. Both students will attend REDCap trainings and design the data collection tool as well as train the students in the elective and the student managers on entering the data. Data collected for each patient, include: age, gender, ethnicity, number of siblings, number of visits to the Healthy Beginnings Clinic, duration of visit, well child check or sick visit, vaccines given, patients needing catch-up for vaccines, referrals provided, return visits, health education given, primary care provider information given, ROAR books given or donated books given, number of participants at each Growing Years night, and whether or not the patient has a primary care provider in the community. Data collected for the students and attending physicians, include: number of pediatricians volunteering their time each semester, the number of students on the steering committee, the number of students enrolled for each the fall, spring,

and summer semesters, the number of students enrolled multiple semesters, the total number of hours volunteered, and number of Growing Years volunteers. Student managers will analyze data on an ongoing basis with reports presented to the steering committee at the culmination of each semester. This will enable shortcomings to be identified and for changes to be implemented to improve both quality and efficiency.

Abstracts

Nguyen Amy Mailan

Project Title: A Case of Ocular Syphilis in a 36-Year-Old HIV Positive Male

Thematic Area: Public Health and Epidemiology

Abstract: The incidence of syphilis in the United States has increased markedly over the last decade, particularly among men who have sex with men (MSM). Although uncommon, ocular involvement is a potentially devastating clinical manifestation of syphilis. Human immunodeficiency virus (HIV) infection appears to increase the risk of ocular syphilis. Because of the lack of pathognomonic features for ocular syphilis and its ability to occur in both immunocompetent and immunosuppressed individuals, prompt diagnosis requires a high index of suspicion. Ocular syphilis should therefore be considered in MSM and HIV-infected patients presenting with unexplained visual complaints. Herein, we present a case of ocular syphilis in a patient with newly-diagnosed HIV.

Abstracts

Leasia Kiara Natalia

Project Title: Nebulized hypertonic saline reduces pulmonary inflammation by specific mechanisms in rat lung exposed to bacterial endotoxin

Thematic Area: Basic Science

Abstract: Background: Secondary lung infection is a common leading cause of multiple organ failure and subsequent morbidity and mortality, both short and long term. Injury to endothelial-capillary interface by direct application of bacterial lipopolysaccharide into the lung results in an increase of pro-inflammatory transcription factors (NF- κ B), inflammatory mediators (TNF α , IL-1 β , IL-6, IL-8/CINC-1, IFN γ , RANTES, MMP-13) and neutrophils. Nebulized hypertonic saline (HTS) is a well-established therapy in several patient populations. Novel use of nebulized HTS has already shown to reduce shock related ALI as it attenuates the pro-inflammatory response, namely MMP-13, and promotes the clearance of alveolar fluid in the setting of pulmonary edema. It is unclear by which specific mechanism each of these pro-inflammatory mediators are reduced with the treatment of nebulized hypertonic saline. Methods: Sprague-Dawley rats, administered with intratracheal LPS, were treated with nebulized 7.5% hypertonic saline at 2L/min for 15 min. Bronchoalveolar lavage was used to evaluate lung leak and rat lung was assed for cytokine content and myeloperoxidase (MPO) activity. Results: MPO activity was greatest in lung tissue of rat lung exposed to LPS $p < 0.05$. IL-10 was highest in rat lung exposed to LPS vs. LPS+HTS, $p > 0.05$. CINC-2 α/β was decreased in lung tissue of rats not exposed to LPS versus rats exposed to LPS, with or without neb treatment $p < 0.05$ for NS+NS vs. LPS, LPS+NS, LPS+HTS. $p < 0.01$ for NS+HTS vs. LPS, LPS+NS, LPS+H₂O, LPS+HTS. neb vs. LPS+H₂O neb. Rats unexposed to LPS had the least amount of protein leak in their BALF * $p < 0.05$ for NS+NS and NS+HTS vs. LPS+NS. * $p < 0.05$ for LPS vs. LPS+HTS. ** $p < 0.01$ for NS+NS and NS+HTS vs. LPS+HTS and LPS+H₂O.

Abstracts

Wong Chelsea

Project Title: Refugee Health II

Thematic Area: Global Health

Abstract: The ACGME defines curriculum as “a formal educational plan based on results of a needs assessment, and including goals and objectives developed to meet the needs identified, educational activities through which the plan is implemented, and evaluation of the plan with feedback to provide continued improvement in the educational process.” The Refugee Health II elective is designed to meet these curricular requirements, with alignment between the needs assessment, broad goals, specific learning objectives, educational activities, and evaluation. Meetings with medical students interested in refugee health revealed that they have little opportunity to practice communication with interpreters, reflect on cultural interactions and negotiation, or gain exposure to maladies uncommon in the U.S. such as nutritional deficiencies, TB, and worm infections. Meetings with the head of the cultural effectiveness medicine thread in the medical school helped elucidate how the curriculum could best complement existing medical student experiences (see the Refugee I Health Elective, which is a prerequisite for this course). A literature review revealed no previous published clinical refugee health electives. Meetings with the medical head of the clinic also ensured that the medical needs of the patients and the clinic were complemented so as to maximize service learning.

Abstracts

Yang Alyssa Marie

Project Title: Latino Parents' Perceptions of Weight Terminology Used in Pediatric Weight Counseling

Thematic Area: Public Health and Epidemiology

Abstract: Objective: To identify which English and Spanish terms Latino parents consider motivating, and culturally and linguistically appropriate, for provider use during weight counseling of overweight and obese Latino youth. Design/Methods: Latino parent perceptions of common Spanish and English terms for overweight were discussed with 54 parents in six focus groups (3 English, 3 Spanish). ATLAS.ti software was used for qualitative analysis. An initial codebook was used to code passages for English and Spanish terminology separately. Subsequent changes to the coded passages and creation of new codes were made by team consensus. Results: “Demasiado peso para su salud” (too much weight for his/her health) was the only phrase for excess weight that was consistently identified as motivating and non-offensive by Spanish-speaking parents. “Sobrepeso” (overweight), a commonly used term among health care providers, was motivating to some parents but offensive to others. English-speaking parents had mixed reactions to “unhealthy weight”, “weight problem” and “overweight”, finding them motivating, confusing, or insulting. Parents found fat/”gordo” and obese/”obeso” consistently offensive. Most participants found growth charts and the term “BMI” confusing. Parents consistently reported that providers could enhance motivation and avoid offending families by linking a child's weight to health risks, particularly diabetes. Conclusions: “Demasiado peso para su salud” (too much weight for his/her health) was motivating to many Spanish-speaking Latino parents. Among English-speaking Latino parents, no single English term emerged as motivating, well-understood, and non-offensive. Linking a child’s excess weight with increased health risks was motivating and valuable to many parents regardless of language spoken.

Abstracts

Tsen Yu-Shan Diana

Project Title: Physician Burnout and the Utility of Mentoring Programs for Medical Students

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Doctors care for the people, but how do they care for themselves? They say to take care of yourself before you can take care of others, but this attitude is not commonly embraced among physicians and trainees. The stresses of performing well, learning high volumes of material and developing a professional identity plague medical students, while they also encounter such psychosocial stressors as death and dying, ethical dilemmas, long workdays, poor sleep habits and challenging patients as they continue in their career. As physicians, repeated exposure to these and additional stressors result in so-called “compassion fatigue”, and great numbers of physicians report burnout and anxiety (Dyrbye et al, 2006). Compound this with the fact that few training programs emphasize wellness programming and self-care, and this well-trodden path to burnout becomes seemingly inevitable for generations of healthcare professionals tasked with healing. Helping future physicians learn how to manage these stresses is vital to their well-being, thus it is imperative that medical schools both recognize this as a serious problem and invest in appropriate curricular and community infrastructure to educate and support their students. This paper will bring to light the impact of physician burnout, touch on success stories of mentoring programs in medical training, and advocate for the implementation and continued financial support of such programs in U.S. medical schools.

Abstracts

Stutzman Nicole Cristina

Project Title: Science Discovery- Medical School Experience

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Science outreach programs have become an increasingly prominent aspect of education in the United States. Organizations such as CU Science Discovery have formed in order to promote development of these programs. The goal of these programs is to assist students in gaining experience in science that they may otherwise not receive. Partnerships with large academic institutions give students exposure to the realities of careers in science and research that is impossible in a high school classroom. Our project aimed to develop such a science outreach program for a group of high school students in Aurora, Colorado in conjunction with the University of Colorado Health Sciences Center and Science Discovery. Through basic pre- and post-testing and student feedback, we were able to assess the impact of the weeklong program on the students' interest in a career in science and knowledge of basic medical principles covered during the course.

Abstracts

Wachtel Sarah R

Project Title: Self-Efficacy and Satisfaction with Care in Patients with Type II Diabetes Enrolled in Patient Health Educator Program

Thematic Area: Clinical Research

Abstract: Numerous studies have shown the benefit of education programs that focus on empowerment and self-management in people with diabetes. Also within the innovative focus of comprehensive care for patients with diabetes is the group visit model, in which group sessions with other patients, a social worker, and physician accompany a patient's routine diabetes follow-up visits. Like the activating education programs, these group sessions have been shown to improve diabetes control. With our study, we aim to show that a Patient Health Educator Program focusing on self-management at the Salud Family Health Centers, and group visit model at the Salud Family Health Centers, significantly improve measures of self-efficacy, patient activation, and satisfaction with care in patients with type II diabetes.

Abstracts

Dvanajscak Zeljko

Project Title: Poster title: In search of factors controlling neural stem cell activation following demyelinating injury in zebrafish.

Thematic Area: Basic Science

Abstract: Proper function of the Central Nervous System (CNS) in humans requires electrical insulation of axons by myelin, a multilayered envelope produced by oligodendrocytes, one of the major classes of glial cells. Myelin pathology is a hallmark of a wide range of neurological diseases, therefore, it is important to develop strategies for efficient replacement of oligodendrocytes. One potential source of new oligodendrocytes is Neural Stem Cells (NSCs), a rare population of cells present in discrete niches of the adult human CNS. NSCs, although typically quiescent, can respond to oligodendrocyte injury by dividing and giving rise to daughter cells capable of forming new myelin. The mechanisms regulating the balance between NSC quiescence and recruitment remain incompletely understood. In order to uncover molecular signals regulating NSC division, we are employing the zebrafish model organism due to its abundant population of NSCs and technical advantages that permit *in vivo* studies of cellular behavior. In particular, we set out to test the hypothesis that signaling modulated by the growth factor Pleiotrophin regulates NSC proliferation by simultaneously activating PI3K-Akt signaling and Hes/Her gene expression via the Notch pathway. To produce an experimental situation where NSCs are induced to divide, we are developing an injury model whereby oligodendrocytes can be ablated in a specific, temporally controllable fashion. This technique will allow for genetic and pharmacological manipulation of Pleiotrophin signaling components in the context of direct cellular injury. Further, we are expanding our investigation into additional molecular networks that may function in conjunction with pleiotrophin signaling to fine-tune the frequency of NSC division. To this aim, we report methods for the isolation of NSCs and their total cellular mRNA for the purpose of transcriptome analysis. Overall, our aim is to uncover mechanisms that can serve as targets for the development of therapeutics for the augmentation of the NSC regenerative response following oligodendrocyte insult.

Abstracts

Gilliam Sheaffer

Project Title: Helmet Heads, a Colorado Initiative

Thematic Area: Bioethics, Humanities, Arts and Education

Abstract: Title: Helmet Heads, a Colorado Initiative Background/Objectives: Helmet use has repeatedly been shown to reduce morbidity and mortality(1,2,3,4,7). Children, especially those of low socioeconomic status, have high incidence of head and brain injury due to low helmet use (9,10). A primary barrier to helmet use at a public elementary school in Aurora, Colorado was helmet cost (14). The goal of this project is to expand a helmet education curriculum for second grade students in Colorado and create a sustainable helmet education foundation.

Methodology: Expanding on a helmet education curriculum developed by Corey Dobson, University of Colorado SOM class of 2012, the curriculum reach grew from one low income (Title I) school to four in 2013 and six in 2014. Conclusions: A helmet education curriculum had a six fold increase in curriculum reach, distributing helmets to 910 second grade students over two years. A partnership in December 2013 between Helmet Heads and the University of Denver Executive MBA program offered further financial and business support. Helmet Heads incorporated as a 501(c)(3) nonprofit organization in the fall of 2014 and is on track to become a sustainable nonprofit organization that can bring helmets and helmet education to all Colorado second grade students.

Abstracts

Munoz Amanda

Project Title: Liver X-Receptor effects on Fatty Acids and Bone Health

Thematic Area: Basic Science

Abstract: Introduction: Liver X Receptors (LXR) are responsible for cholesterol efflux from cells. Studies involving the use of statins have shown that decreased serum cholesterol levels actually increase osteoblast differentiation secondary to increased expression of Bone Morphogenetic protein -2 (BMP-2). LXR is also important in the regulation of Sterol Response Element Binding Proteins 1 & 2 (SREBP1a, 1c, & 2). SREBP-1 have been shown to be important in fatty acid synthesis by regulating enzymes like Fatty Acid Synthase (FAS). SREBP-1c which is more important in the fatty acid synthesis pathway is affected by elevated levels of cellular cholesterol. The aim of this study is determine the presence and expression levels of cholesterol efflux markers, fatty acid synthesis markers, and known markers for osteoclasts and osteoblasts in knockout mice to examine what link there might be between cholesterol and fatty acid levels and bone health. Materials and Methods: Femurs of C57BL/6 mice that had been genetically modified to be LXR α $-/-$, LXR β $-/-$, or LXR α $-/-$, β $-/-$ as well as wildtype mice were obtained from the Cummins Lab3. Bones were powdered in order to be converted to RNA using Qiagen RNeasy Mini kit. RNA was then converted to cDNA Applied Biosystems High-Capacity RNA to cDNA kit. The cDNA will be used in qRT-PCR using SSO Fast Syber on a Bio Rad CFX Connect Real Time PCR detection system. Results: I am in the progress of validating primers for the project still and thus we have not begun data collection. I hope to begin collection soon and will place results here once collected. Conclusion: This is still a work in progress project. Data is not present and thus no accurate conclusions can be drawn.

Abstracts

Wolf Camri Jo

Project Title: enCompass Pregnancy

Thematic Area: Clinical Research

Abstract: Childhood obesity in America is a growing problem and often begins in very early stages of life, with many changes occurring in utero. Despite standard counseling by providers, women continue to exceed the recommended amount of weight gain during pregnancy, leading to an increased risk of many health problems for her and her child. The tool enCompass Pregnancy was created with the goal of increasing patient education surrounding healthy habits and adherence to established guidelines during pregnancy. Participants were recruited from one Denver area clinic and the study design involved the use of pre and post surveys to evaluate the efficacy and patient opinion of enCompass Pregnancy. Final data is pending, and pertinent endpoints will include: patient satisfaction, amount of gestational weight gain, infant birth weight, pregnancy complication rate, and self-reported adherence to guidelines in the tool.