Thursday, March 6, 2014

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

Key Note Speaker
Dean Krugman
3:15 pm – 3:30 pm
Library Lobby

ANSHUTZ MEDICAL CAMPUS
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

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**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!

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ABSTRACTS

Aquino, Alian

Project Title: Improving Medical Education at Kathmandu Model Hospital, through Problem Based Learning (PBL)

Thematic Area: Humanities, Social Science and Education

Mentor: Jennifer Bellows Mentor Department: Emergency Medicine/Global Health

Abstract:

Problem based learning is a form of education in which information is mastered in the same context in which it will be used it is seen as a student driven process in which the student sets the pace and the role of the teacher becomes one of guide, facilitator, and resource (11). This project examines how to begin to implement a medical school curriculum based on problem based learning (PBL) cases. One complete PBL case was completed for use in Kathmandu Model Hospital (KMH) medical school. Additionally, difficulties encountered while drafting cases, designing curricula, and partnership between institutions separated by many miles will be discussed.
ABSTRACTS

Ayari, Natalie

Project Title: Perceptions on cannabis use and effects during pregnancy: a survey of pregnant young women

Thematic Area: Clinical Science

Mentor: Jeanelle Sheeder  Mentor Department: Obstetrics and Gynecology

Abstract:

The aim of this project was to understand the perceptions about the effects and safety of marijuana use as well as actual use among pregnant young women. By identifying common positive and negative beliefs about the maternal and fetal risks and effects of marijuana use, future educational efforts can be tailored to this population. We hypothesized that in pregnant 14-21 year olds, marijuana users (by self-report or by urine toxicology screen) would be more likely to have positive perceptions about the effects of marijuana on pregnancy. Understanding beliefs about marijuana effects on pregnancy among these patients will provide an opportunity for education and targeted interventions.

Methods

Participants (n=28) were recruited from the Colorado Adolescent Maternity Program (CAMP) clinic at Childrens Hospital Colorado at their initial prenatal intake appointment. Participants were asked to complete a short survey assessing their perceptions of marijuana use both in general and specifically during pregnancy. Their use of marijuana was also assessed with a urine toxicology screen that is performed as part of the CAMP clinic intake process. The survey responses were then paired with urinary toxicology results.

Results

Of the 28 young women enrolled, 14 (50%) self-reported marijuana use during pregnancy and 2 (15%) additional participants had a positive urinary toxicology screen for marijuana despite self-reporting no use. Marijuana users were more likely to report that someone around them such as a boyfriend or family member uses marijuana (81.3% vs. 66.7%). Marijuana users were more likely to have a positive perception of marijuana use in general. For example, 81.3% of users agreed with the statement that marijuana is a natural herb and 75% of users agreed that marijuana takes pain away. Marijuana users were also more likely to have a positive perception of marijuana use during pregnancy. For example, 43.8% of users agreed that marijuana helps keep food down during pregnancy. However, only 37.5% of marijuana users disagreed that it was not safe to use during pregnancy, meaning that 62.5% of users felt that it was unsafe.
Conclusions

This study was important in exploring the common perceptions about marijuana use in general and during pregnancy among young pregnant women. While the differences between the group of participants who use marijuana and those who do not were not statistically significant, they demonstrate common trends and perceptions that can be used to create screening and educational programs in the future for this patient population.
**Project Title:** Transitions of Care in the Underserved: A Literature Review

**Thematic Area:** Clinical Science

**Mentor:** Greg Misky  
**Mentor Department:** Internal Medicine

**Abstract:**

**Background**

Failure to transition from acute to outpatient care has been well studied without regard to insurance status. Common experience suggests that underserved patients face unique barriers to effective post-hospital care. This study aimed to review literature to explore barriers to ideal care transitions in underserved patients in the United States.

**Methods**

Literature evaluating barriers to post-acute care in the underserved published from January 1960 to October 2013 was reviewed. Underserved was defined as patients who were homeless, lacked insurance, or had Medicaid coverage. Two reviewers determined which articles met inclusion criteria.

**Results**

Literature search identified 24 articles spanning populations of uninsured (4), Medicaid (3), Medicaid and uninsured (7), and homeless patients (5), with the remainder representing a mixed population. Most commonly identified barriers across all subgroups were costs of medications or services, access to services and health literacy.

**Conclusions**

Despite examining more than 50 years of literature, few studies specifically evaluating barriers to post-acute care in underserved patients were found. Perhaps because of this difficulty in defining this group, study populations were heterogeneous. Barriers identified were multiple and diverse. Differences between subgroups were difficult to assess as not all studies were intended to investigate all potential barriers. Likewise the paucity of interventional studies in this group reveals the limit of our knowledge regarding care transitions in underserved patients.
Based upon these findings, more research regarding care transitions in underserved patients is needed. Discharging providers should also be aware of social, cost, and access barriers at an individual level when caring for underserved patients.
Objective: To assess the prevalence of CPAP compliance and the effect of equipment cost on noncompliance in the CICP population.

Design: Cross-sectional questionnaire

Setting: National Jewish Health, Denver Colorado

Methods: All patients diagnosed with OSAS at National Jewish Health between January 1, 2011 and June 31, 2011 who were enrolled in CICP or who had private insurance were assessed for CPAP compliance using responses to a self-completed questionnaire.

Results: Prevalence of compliance in the CICP cohort was 28%, while the prevalence of compliance in the private insurance cohort was 51%. Comfort and convenience combined were the number one barrier to compliance in the insurance cohort, while cost of CPAP equipment was the number one reason for noncompliance in the CICP cohort.

Conclusion: Based on responses, cost is a significant barrier to CPAP compliance in the CICP population. When discussing OSAS treatment options with patients enrolled in CICP it may be beneficial to discuss alternative treatment options or explore unconventional ways to obtain treatment equipment.
Project Title: The Rates and Postoperative Sequelae of Uterine Perforation with Uterine Manipulators During Laparoscopic and Robotic Gynecologic Surgery.

Thematic Area: Clinical Science

Mentor: Jaime Arruda
Mentor Department: ob/gyn

Abstract:

There is a paucity of information in the literature regarding rates of uterine perforation by uterine manipulators during laparoscopic and robotic gynecologic surgeries, as well as the risk factors for and clinical sequelae of said perforations. This study has been designed to evaluate rates, risk factors, and complications from uterine perforations with uterine manipulators. Due to unforeseen complications the execution of this study has been delayed. As of the submission of this paper, the COMIRB application is in review, the case lists are being gathered, and final adjustments are being made to the RedCap data collection database. Once these details are complete, laparoscopic and robotic gynecologic cases performed at the University of Colorado Hospital (UCH) between 2009 and 2013 will be reviewed. Cases in which uterine perforation with uterine manipulators occurred will be identified, and the charts examined for risk factors and surgical complications. It is anticipated that data collection and analysis will be complete by March 1, 2014.
Project Title: CU Peru In-Depth Program Evaluation

Thematic Area: Global Health

Mentor: Jennifer Bellows
Mentor Department: Emergency Medicine

Abstract:

In 1996 the World Health Organization (WHO) developed the Integrated Management of Childhood Illness program (IMCI) as an evidence-based, cost effective framework for improving children's health in underserved communities 1,2 . Peru was one of the first countries to adapt the IMCI to communities and publish materials to facilitate implementation of the program 1,4,5 . The Peruvian community IMCI program calls for the education of community health promoters (CHW) in topics of breast feeding, nutrition, appropriate disposal of feces, handwashing, vaccination, use of bed nets, management of childhood illnesses and infections, triage and follow up 1,2 . While Peru was quick in developing thorough materials, implementation of the trainings was not as successful as hoped, particularly in the poorest and most inaccessible region: Loreto 3,4,5 . According to the Peruvian Ministry of Health, infant mortality in Loreto is over double the Peruvian national average and Loreto leads the nation in children without clean water or sanitation 7,8 . These great discrepancies and potential for education led a group of medical students to start an innovative CHW training project in the region. Starting in 2008, health professions students have travelled to the region to teach community IMCI to lay health promoters in the region. By 2011, the group had experienced significant program drift and in order to address many questions about how to best guide programmatic decision making, a formal program evaluation was initiated. Community assessments were done in 2011, a formal program description was completed in 2012, a preliminary strategic plan was developed in 2013 and the group is now working to implement qualitative stakeholder interviews. These various tools have provided valuable information to the organization regarding the communities they serve, the role of the health promoters and the best future direction for the program.
DeSalvo, Kelsey

Project Title: Do Medical Students Retain Misconceptions about Intrauterine Devices? A Survey of Medical Students’ Knowledge and Beliefs

Thematic Area: Clinical Science

Mentor: Stephanie Teal Mentor Department: OBGYN

Abstract:

Abstract

Background: Studies demonstrate that both providers and medical students retain insufficient knowledge and misconceptions about IUDs and are restrictive of IUD use, especially for nulliparous and adolescent patients. The aim of this study was to assess and compare IUD knowledge and beliefs of first and fourth year medical students.

Methods: In this cross-sectional study, first and fourth year medical students at the University of Colorado were surveyed regarding their knowledge about IUDs, their attitudes towards IUDs and were asked whether or not they would offer IUDs to appropriate patients in clinical vignettes.

Results: Overall, 201 students returned the survey (66% response rate). Fourth year medical students demonstrated superior IUD knowledge compared to first year medical students in all the knowledge categories of the survey (p<0.001) except in the Common IUD Myths/Misconceptions category (p=0.27). Only 41% and 43% of students recommended an IUD for a nulliparous patient and an adolescent patient, respectively, however 88% recommended an IUD to a parous patient in the clinical vignettes.

Conclusion: Fourth year medical students at the University of Colorado have greater knowledge about intrauterine contraception compared to first year medical students, however they retain significant knowledge gaps and hold misconceptions that associate IUDs with ectopic pregnancy, infertility, and PID. The results reveal a need for improvement in IUD education during medical school with a focus on selecting appropriate IUD candidates and correcting erroneous beliefs about IUDs.
Project Title: Childhood and Adolescent Obesity: Pediatric Obesity Pilot Project Curricular Materials Development and Literature Review

Thematic Area: Public Health and Epidemiology

Mentor: Bonnie Jortberg

Mentor Department: Family Medicine

Abstract:

CHILDHOOD AND ADOLESCENT OBESITY: PEDIATRICS OBESITY PILOT PROJECT CURRICULAR MATERIALS DEVELOPMENT AND LITERATURE REVIEW. S Farazandeh, (M.D., SOM), B Jortberg, and C Coxe, Department of Medicine, University of Colorado, Denver, CO.

Background: Obesity has reached epidemic levels in the United States as well as throughout much of the world. The rise in childhood obesity has raised particular concern as it is associated with severe health consequences and is a very significant risk factor for adult morbidity and mortality. It is also a critical period for successful intervention for management or prevention. Consequently, such interventions are becoming a public health priority. The Pediatric Obesity Pilot Projects Fit Family Challenge (FFC) is one such program which aims to integrate childhood obesity guidelines into clinical primary care and community settings across Colorado. My project was to develop the Family Guide as the curricular materials participants used in the FFC.

Methods: FFC guidelines were developed using evidence-based strategies and resources from the Health TeamWorks, US Preventive Services Task Force, the AAP, and the CDC recommendations regarding the prevention, assessment, and treatment of pediatric obesity. The treatment program uses the methods of motivational interviewing and SMART goal setting, and encourages the 5-2-1-0-based behaviors with other recommended targeted behaviors. I developed the Family Guide for the FFC using these guidelines, consisting of 10 modules focused on the targeted behaviors. To assess participant satisfaction with the Family guide and FFC program, a survey was completed by participants. Results were analyzed qualitatively.

Results: Preliminary FFC results demonstrate decreases in BMI, systolic and diastolic BPs. BMI percentile decreased from a mean of 95.26% at baseline to 94.87% at &gt;21 months, not statistically significant. Lifestyle outcomes of fruit/vegetable intake and physical activity increased, statistically significant. Sugar beverage consumption and screen time decreased. Satisfaction survey results showed that 81% indicated the Family Guide was Very useful or Useful. Activity Handouts were reported to be the most helpful part. 94.3% reported using the Family Guide outside of class Often or Sometimes. 90.9% said the Family Guide was Very easy or Easy to use.

Conclusions: The positive impressions of the Family Guide indicate its importance in complement the FFC program. Preliminary FFC clinical results, while not reaching statistical significance, are promising
given that overweight children demonstrate increases in BMI and blood pressure each year. Statistically significant changes in lifestyle outcomes results signify that the project is having a positive impact on the behaviors of FFC participants. These successes demonstrate that such a program in the primary care setting may be a successful point of intervention.
**Project Title:** Special Operator Clinical Ultrasound Course

**Thematic Area:** Humanities, Social Science and Education

**Mentor:** Vaughn Browne  
**Mentor Department:** Emergency Dept

**Abstract:**

Advances in ultrasound (US) technology and training have had a strong and proven impact on emergency medicine, critical care, surgery, obstetrics, and cardiology. Over the past ten years, improvements in imaging technology, storage, and microprocessors, have reduced the size and cost of US systems allowing for increased usage at the patients bedside and wide adoption by physicians across multiple medical specialties. Hand carried, portable ultrasound machines were originally developed for use in the military; however, it is still not regular practice to use these machines on the front lines of battle, including Afghanistan and Iraq. Following an ultrasound lecture during my first semester as a medical student at the University of Colorado School of Medicine, I immediately realized its potential for military Special Forces (SF).

Prior to attending medical school, I was a Green Beret in the Army Special Forces that specialized in emergency medical care on the battlefield. I had never had any ultrasound training during my eight years of military service. Looking back on my deployments, I came to the realization that there was a definite need for emergency ultrasound (EUS) training for Special Forces Medics. The goal of my MSA was to develop a curriculum and training program focused on incorporating EUS, within the scope of practice of the SF medic.
Project Title: Improving Specialty Care Access for Underserved Patients in Colorado

Thematic Area: Public Health and Epidemiology

Mentor: Joseph Kay

Mentor Department: Medicine

Abstract:

Recent research by the Colorado Health Institute has shown that securing specialty care referrals for underserved patients is difficult, inconsistent and often futile. In fact, for certain specialties such as endocrinology, orthopedics, and neurology, clinics in Colorado reported that they were unable to secure appointments for underserved patients in these specialties in greater than 40% of attempted referrals. The goal of my project was to raise awareness of the current access issues and reach out to specialists in the community to determine potential solutions for improving access to care for underserved patients. I started my project by performing a literature review and meeting with community health organizations to obtain an overall sense for the current status and work being done on the issue. Next, I generated a semi-structured interview tool for discussing the current issues and ideas for change with specialists. A specialist focus group was held utilizing the interview tool at the 2013 Colorado Medical Society Annual Conference. Overall, the focus group participants identified key issues for providing underserved patients with specialty care such as inability to access additional services for underserved patients, fear of becoming the sole provider (and thus taking on the majority of financial burden) for a particular specialty, and a general lack of accountability in the population (no-shows). The group also identified a number of potential solutions such as creating virtual e-consult systems using mobile technology, specialist outreach to provide basic triage information to primary care physicians, and expanding current underserved referral networks in the Front Range such as Doctors Care. Using the focus group discussion as a guide, Amy Beeson (MSII) and I created an editorial discussing specialty care issues that was published in the Colorado Medical Society bi-monthly magazine in November/December 2013. Future work on this project will include holding key informant specialist interviews and advocating for measures to address specialty care access for underserved patients in the next round of health care reforms coming out of the (Anschutz) campus, at the city level, and state initiatives.
ABSTRACTS

Hall, Francis

Project Title: Using Methylated miRNA from Saliva as a Screening Test for Head and Neck Cancer

Thematic Area: Basic Science

Mentor: Shi-Long Lu  Mentor Department: Otolaryngology

Abstract:

Head and neck squamous cell carcinoma (HNSCC) carries a 5-year survival rate of less than 50%, with considerable morbidity (very aggressive and invasive malignancy). Development and identification of biomarkers to better classify HNSCC are constantly going on in Head and Neck Cancer research. Once such biomarker is microRNA. DNA methylation of miRNA is a common feature in human malignancy, and could be a useful biomarker for cancer diagnosis. Additionally, miRNA can be identified in saliva. We sought to identify DNA methylation of miRNA present in HNSCC, and isolate these biomarkers from the patient's saliva. If DNA methylation levels of of miRNAs are different in HNSCC tissue compared to normal tissue, than those same miRNA can be used to assess methylation levels of DNA extracted from saliva of HNSCC patients; further allowing saliva to be used as a screening method for HNSCC.

Methods: Study was conducted as a partnership between the University of Colorado Department of Otolaryngology and Oregon Health and Sciences University (OHSU). Tissue samples of patients with known HNSCC were acquired, and compared to normal tissue from the same patient, and tissue from a patient without HNSCC. Furthermore, saliva was obtained from the same patients in which tissue was acquired. Genomic DNA was isolated from both tissue and saliva samples. Screening for DNA methylation of miRNA biomarkers was accomplished via polymerase chain reaction and UV fluorescent analysis.

Additionally, genomic DNA was converted by bisulfide to become bisDNA. bisDNA underwent quantitative methylation specific polymerase chain reaction using SYBR green reaction system. The relative methylation level was calculated by the \[2^{\Delta\Delta Ct}\] method. Methylation specific actin primer was used as internal control.

Results: Saliva obtained at OHSU was provided by 69 volunteers for HNSCC screening at the OHSU HNSCC health care day. The medical status of these volunteers was blind to the Colorado HNSCC laboratory. Project is still in progress, and not all samples have been analyzed. Anticipate result analysis completed by poster presentation.

Discussion: Although the project has yet to be finished, initial data show the feasibility of using DNA methylation levels of miRNA as biomarkers for HNSCC detection. However, the medical status of the patients will not be known until the data analysis has been completed, thereby preventing any
validation of this experiment as a blinded trial to the unpublished data that found higher DNA methylation levels of miRNAs 9-1, 124-1, 124-2, 124-3, and 137.
PROJECT TITLE: WHAT IS THE ROLE OF THE VISUAL ARTS IN RAISING AWARENESS AND CHANGING ATTITUDES ABOUT MENTAL ILLNESS?

THEMATIC AREA: Humanities, Social Science and Education

Mentor: Therese Jones  Mentor Department: Medicine

Abstract:

Mental illness is an important public health topic in Colorado. In this paper I investigate how the visual arts are used to increase awareness and change attitudes about mental illness. Examples illustrating how the visual arts are used by health care providers and patients to promote empathy and understanding for those suffering from mental illness.
Abstract:

Objective: The occurrence of pediatric asthma has been associated with exposure to chronic stress. This study examined the relationship between maternal and community risk factors and asthma in a sample of maltreated children in foster care.

Method: Interviews were conducted with 365 maltreated children in foster care. Measures included youth/caregiver reports of asthma, an index of maternal risk based on data abstracted from child welfare records and community violence exposure.

Results: After controlling for demographic variables, maternal risk was associated with the presence of asthma (OR=1.314, 95% CI=1.09 “1.58). Community violence exposure, however, was not related to the presence of asthma.

Conclusion: Maternal risk factors were significantly associated with the presence of asthma in a foster care population. Physicians who care for maltreated children in foster care should be particularly attuned to the presence of these additional risk factors that may place high-risk children at increased risk for chronic health problems.
ABSTRACTS

Hendrickson, Sarah

Project Title: A Community Needs Assessment of Service Provider Understanding of Human Trafficking and its Presence as a Major Public Health Dilemma

Thematic Area: Public Health and Epidemiology

Mentor: Catherine Battaglia

Mentor Department: School of Public Health, Department of Family Medicine

Abstract:

Objective: Human trafficking and human slavery remain prominent social problems throughout the world, despite centuries of advocacy work to eradicate this social and public health dilemma. Around the globe, an estimated 2.5 million people are trafficked annually, with 45,000-50,000 trafficked into the US. These individuals represent the quintessential hidden population for medical providers. Of note, up to 80% of these victims are female and up to 50% are minors. The objective of this project is to assess provider awareness of human trafficking, specifically in the State of Colorado. The information obtained will be used to 1) catalog the most prevalent medical needs of trafficking survivors, 2) identify and coordinate available services for victims, and 3) develop educational curriculum to better train service providers, including physicians, to recognize and treat this population.

Methods: In collaboration with the Laboratory to Combat Human Trafficking (LCHT) a community-needs assessment (CNA) of 5 major cities in Colorado was performed utilizing a written survey and phone interviews. The CNA was distributed to service providers in multiple fields, including law enforcement, medical professionals, and social workers. The surveys 48 questions were aimed towards gaining understanding of provider awareness of human trafficking, evaluating the availability of services of victims, and gauging community member awareness of the prevalence of human trafficking in the Colorado area. Outcome data additionally included estimated organizational capacities for providing each of the 7 critical services required by trafficking victims: case management, translation, medical, mental health, legal, housing, and emergency.

Results: At this time, survey data from Denver and Fort Collins have been extensively analyzed. Data from Denver indicates that providers have a basic awareness of human trafficking, with 96% of providers indicating some knowledge of this issue and with 66% of providers indicating knowledge of >24 months. 48% of organizations surveyed indicated that they have directly provided services to human trafficking victims. Of these, only 38% could provide medical care and only 31% were capable
of providing mental health care. Additionally, of all surveyed organizations only one was able to provide all 7 of the critical services needed by many trafficking victims.

Conclusions: Human trafficking victims are a hidden population that require but do not regularly receive extensive medical and mental health care. Data from Colorado indicates that providers are aware of this population and believe that they may have interacted with trafficking survivors, but these same providers are not adequately equipped to provide necessary care or to identify victims. Data also indicates that these same providers, from multiple fields, are interested in obtaining further education on this matter. It is clear that further programs providing education on human trafficking are needed and that enhanced coordination of multidisciplinary care is needed to provide appropriate care.
ABSTRACTS

Juan, Brian

Project Title: Pop songs and mental illness: rock, roll, and the romanticization of psychosis

Thematic Area: Humanities, Social Science and Education

Mentor: Therese Jones  Mentor Department: Bioethics and humanities

Abstract:

The medical narrative is a platform with both therapeutic and communicative value: created by patients in response to illness, it provides a contemplative avenue for reflection to chronicle the patient experience for loved ones, caregivers, and posterity. Traditionally conceived in literature (journals, biographies, poetry) and often adapted into films, plays, and television shows, the medical narrative has evolved a new permutation in the form of the pop song. Often downloaded or purchased at retail, overplayed on the radio, covered by other bands, and endlessly looped on music television and internet videos, the pop song is uniquely distinguished from other media by its ability to be ingested by an exponentially larger audience than a book, film, or a TV show. There are many iconoclastic and troubled figures in contemporary music with well-publicized ailments often leading to dire consequences, perhaps most famously addiction to alcohol or drugs and/or major depression leading to social isolation, overdose, or suicide. Oliver Sacks writes that music, uniquely among the arts, is both completely abstract and profoundly emotional. It has no power to represent anything particular or external, but it has a unique power to express inner states or feelings. When popular artists suffering from psychotic disease - a spectrum of psychiatric illness that includes bipolar disorder, schizophrenia, and major depression with psychotic features - reflect on their experiences for the benefit of audiences that buy their albums by the millions, their songs transcend the traditional scope of the medical narrative and become capable of affecting an entire society’s perception of psychosis. This paper will examine the patterns surrounding psychotic disease and creativity in a handful of influential contemporary musicians and their impact on peers and fans.
Project Title: Gut a Failure as a Predictor for Intra-Abdominal Abscess

Thematic Area: Global Health

Mentor: Clay Burlew  Mentor Department: Surgery

Abstract:
ABSTRACTS

Kranker, Lindsay

**Project Title:** Designing a Post-Operative Nosocomial Infection Surveillance at Kisiizi Hospital, Uganda

**Thematic Area:** Global Health

**Mentor:** Dave Hibbard  
**Mentor Department:** Family Medicine

**Abstract:**

**Background:** The WHO has estimated that over one million patients worldwide die during or immediately after surgery. Kisiizi Hospital is a 235-bed, private, not-for-profit hospital situated deep in the mountains of southwest Uganda. The hospital performed 4,619 surgical procedures last year and is among the best performing general hospitals in Uganda.

**Objective:** To develop a surveillance tool for post-operative nosocomial infection in a low-resource hospital setting.

**Methods:** During my six weeks at Kisiizi Hospital in 2010, I sought to balance thoroughness of the surveillance tool with the burden of data collection on staff. In addition to basic patient information (patient identifier, gender, age, HIV status, procedure date, etc.), I included the collection of data on surgical site infection rate and mortality rates, so this tool now includes all four of the recommended or highly recommended WHO data values for hospital collection.

**Results:** An original tool for surgical site infection surveillance tool was the major output of this study. This tool could easily serve as a launching point for other low-resource hospital settings wishing to begin data collection in Africa and beyond.

**Conclusions:** Though no data had ever been collected using the system I designed, Kisiizi Hospital continued its interest in improving surgical safety, and it is now the only hospital in Uganda in the first wave of the WHO African Partnerships for Patient Safety (APPS) program. The APPS designated surgical safety as one of two priority areas for the region. They specifically focus on the WHO’s Safe Surgery Saves Lives Challenge, which I referenced extensively in my original work.
ABSTRACTS

Lamborn, Nathan

Project Title: Does the Availability of Anesthesia Medication Cost Information Affect Provider Behavior or Knowledge in an Academic Anesthesiology Group?

Thematic Area: Clinical Science

Mentor: Brian Davidson  Mentor Department: Anesthesiology

Abstract:

BACKGROUND: Medication expense is an area for potential cost reduction in the operating room environment. Anesthesia providers often have minimal knowledge or education related to individual medication cost or reimbursement methods. Studies have shown operating room anesthesia medication wastage ranging from 7.41% to 100%. This study looks at whether anesthesia providers will learn medication cost and change clinical behavior, as evidenced by a reduction of relative medication usage, after a passive educational intervention.

METHODS: This quality improvement project was conducted at a tertiary care academic hospital in Colorado. Participants were anesthesiologists, anesthesiology residents, AAs and CRNAs practicing between August 2012 and April 2013. A pre-intervention survey was circulated, followed by a three month intervention period where anesthesia medication cost labels were placed next to all medications in the anesthesia delivery machines. A post-intervention survey was then circulated to assess medication cost learning. After the intervention operating room anesthesia medication receipts for the pre and post-intervention period were compared against the volume of cases to look for usage change. Two-tailed t-tests with a 95% CI was used for statistical analysis.

RESULTS: There was no statistical change in the relative volume of OR medication use after the price labeling intervention. Neither the average units of medication per case (p=0.80) nor the average units of medication per unit changed significantly (p=0.45). The pre-intervention survey had 69 total respondents and the post-intervention survey had 95 total respondents. The percentage of correct answers on each of the cost medication survey questions was not significantly different after the cost label intervention.

CONCLUSION: This cost analysis showed there was not a decrease in medications used per case after the providers were passively exposed to the cost of operating room medications. The results of the pre and post-intervention survey indicate that anesthesia providers did not learn medication costs through the passive intervention. The results of the survey, combined with the lack of medication cost change, appears to indicate that providers are aware that the medication they choose impacts costs, and that they are influenced by this fact. However, they lack medication cost knowledge that could help them better select lower cost alternatives when possible.
ABSTRACTS

Lebsack, Matthew

Project Title: Impact of a fitness program monitored by accelerometers on a rural Colorado school

Thematic Area: Public Health and Epidemiology

Mentor: Jack Westfall  Mentor Department: Family Medicine

Abstract:

Background: Due to concerns about obesity and the growing cost of healthcare, effective employer-based and technologically-driven fitness programs have been developed for urban settings. However, only a few studies have evaluated the effectiveness of these programs in a rural setting where obesity and health disparities are an even larger issue. Purpose: This paper aims to evaluate the effectiveness of an employer-based fitness program using accelerometers within a rural Colorado school. Methods: This was an evaluation of an existing program in which individuals participated in an incentive-based fitness program over the course of the school year. They were asked to complete pre-and post-fitness program health surveys and a pre-program health perception survey. Biologic parameters were similarly collected. Biologic data and physical activity (steps) were used to assess the effectiveness of the program. Results: The incentive-based fitness program produced non-significant downward trends in several health parameters including body-mass index; the percentage of obese participants decreased from 33.3% to 25%. Significant lowering of HDL (55.4 ±4.2mg/dl vs. 63.6 ±4.0mg/dl, p<0.001) and a significant increase in total cholesterol (183.6 ±7.9mg/dl to 201.9 ±7.8mg/dl, p=0.002) were also seen. Participants monthly average step counts decreased significantly during the program (269,573 ± 179,000 vs. 116,113 ± 144,000, p<0.001). Loose associations between increasing step counts and changes in biometrics were also observed. Conclusions: This fitness program is effective as it produced downward trends in several health indicators including BMI. However, it appears that coaching may be required to maintain participation/motivation within the program. Furthermore, longitudinal data will be required to assess the cost-effectiveness of the program.
ABSTRACTS

Leopold, David

Project Title: Acute appendicitis: A disease severity score for the acute care surgeon

Thematic Area: Clinical Science

Mentor: Jeffery Johnson Mentor Department: General Surgery

Abstract:

BACKGROUND: Analogous to organ injury scales developed for trauma, a scoring system is needed for acute care surgery. The purpose of this study was to develop a disease severity score (DSS) for acute appendicitis, the most common surgical emergency.

METHODS: A panel of acute care surgery experts reviewed the literature and developed a DSS for acute appendicitis as follows: grade 1, inflamed; Grade 2, gangrenous; Grade 3, perforated with localized free fluid; Grade 4, perforated with a regional abscess; and Grade 5, perforated with diffuse peritonitis. We applied the DSS to 1,000 consecutive patients undergoing appendectomy from 1999 to 2009 and examined its association with outcomes (mortality, length of hospital stay, incidence of in-hospital, and postdischarge complications). Of the 1,000 patients, 82 were excluded owing to negative or interval appendectomy or advanced end-stage renal disease.

RESULTS: Among 918 eligible patients, the DSS distribution was Grade 1 at 62.4%, Grade 2 at 13.0%, Grade 3 at 18.7%, Grade 4 at 4.4%, and Grade 5 at 1.5%. Statistical analyses indicated a stepwise risk increase in adverse outcomes with higher DSS grades (statistics Q 0.75 for all outcomes). Covariates (age, sex, and type of surgical access) did not add to the predictive power of DSS.

CONCLUSION: Based on this single-institution study, the proposed appendicitis DSS seems to be a useful tool. This DSS can inform future, national efforts, which can build on the knowledge provided by the present investigation. This DSS may be useful for comparing therapeutic modalities, planning resource use, improving programs, and adjusting reimbursement (J Trauma Acute Care Surg. 2013;74:32Y36. Copyright * 2013 by Lippincott Williams &amp; Wilkins)

LEVEL OF EVIDENCE: Epidemiologic study, level III.
ABSTRACTS

Matthews, Nicole

Project Title: Addressing barriers to utilizing USPSTF guidelines in rural Colorado family medicine practices through the implementation of targeted patient education materials.

Thematic Area: Public Health and Epidemiology

Mentor: Michele Doucette
Mentor Department: Family Medicine

Abstract:

The objective of this study was to obtain a qualitative assessment of the utility of written patient education materials on the United States Preventive Services Task Force (USPSTF) guidelines in increasing rural Colorado physicians ability to address preventive health care needs with patients. Comprehensive patient education materials including all applicable A and B USPSTF recommendations were designed in the form of paper pamphlets for women ages 30-49 and distributed to providers at ten rural clinics in Colorado. The utility of the materials was assessed via three follow-up physician surveys. Survey responses indicated that the majority of physicians consistently used the patient education materials and felt they were useful in addressing prevention with patients. Time and creating an established method for distribution of the materials were identified as barriers to the use of the materials in practice.
ABSTRACTS

McBride, Clinton

Project Title: C-STAHR

Thematic Area: Public Health and Epidemiology

Mentor: Tillman Farley  Mentor Department: Family Medicine

Abstract:

CSTAHR - A Sustainable CBPR partnership between Medical Students and Community Members - Group Formation and Leadership Transitions

Purpose (50 word limit):

To share best practices in group formation/cohesion and leadership transitions in medical student-community CBPR partnerships. Community and Students Together Against Healthcare Racism (C-STAHR) was formed by African-American and Latino community members, 2040 Partners for Health, and medical students from University of Colorado to study and address perceived discrimination in healthcare.

Steps for Implementation (100 word limit):

1. Invest initial group of community members and medical students.

2. Collaboratively develop a name, mission statement, and group values.

3. Agree upon process of research, analysis, intervention design, and action.

4. Facilitate monthly CAN (Communiversity Action Network) meetings.

5. Participate in bonding activities in and out of meetings.

6. Collaboratively disseminate information through student-community paired communication buddies, as well as at academic conferences and community forums.

7. Use hierarchical causal analysis to develop a consensus theory of the problem (problem and solution trees).

8. Develop and maintain organizational framework to facilitate annual leadership transitions.

9. Measure group cohesion (below).
Champions and Resources Needed (100 word limit):

Community-Based Participatory Research (CBPR) is a growing field of research nationwide but few CBPR partnerships are led by community members and undergraduate medical students. Unique challenges to sustainability are posed by student turn-over and no published research exists on best practices of leadership-transition.

Resources essential to overcoming these challenges include a strong partner and institutional home in the local non-profit group 2040 partners for health Outstanding mentors in the form of clinician researchers (foremost Dr. Tillman Farley) at the school of medicine were critical in advancing the groups research agenda and in navigating the Institutional review process.

Benchmarks for Monitoring Results:

Benchmarks for monitoring group cohesion before and during student leadership transitions in CSTAHR include:

1. Completion of each of the steps for implementation listed above is a benchmark in and of its self.

2. Through three research methods (a single, qualitative retrospective survey, mixed quantitative and qualitative monthly surveys, and quantitative analysis of meeting attendance), our partnership has collected preliminary data on group cohesion before and during our first annual student leadership transition. These methods identified challenges and successes in leadership transitions unique to research partnerships between health-science students and community members.

Conclusions on replicating this in Other Health Centers (100 word limit):

Student-Community CBPR partnerships are multi-level interventions that can reduce health disparities, encourage young researchers to embrace community engagement and health disparities research, reduce feelings of hostility between minority community members and academic medical centers, build capacity in the community, develop and test hypotheses related to public health phenomena, and mobilize community and university resources to take action on public health issues. For these reasons such partnerships should be replicated widely at medical schools around the world. Such partnerships could also be mobilized at community health centers with students or volunteers from undergraduate institutions, Americorps, and other sources.

Thematic Area: Public Health and Epidemiology

Mentor: Jack Westfall M.D. Mentor Department: Family Medicine Department/High Plains Research Network

Abstract:

The Patient-Centered Medical Home (PCMH) has become a dominant model for improving the quality and cost of primary care. If the PCMH is to improve patient outcomes, practices will need to incorporate the PCMH into their daily routine. Geographic isolation, small populations, privacy concerns, and limited high-speed connectivity may limit implementation of the PCMH in rural practice.

Objective: Determine the perceived benefit and the level of implementation of 18 PCMH components for patients seeking care in family medicine clinics in rural Colorado.

Design, Setting, and Participants: The High Plains Research Network (HPRN) is a geographically based community and practice-based research network spanning 30,000 square miles in 16 counties in eastern Colorado. HPRN consists of 58 primary care practices, 120 primary care clinicians, and 145,000 residents.

Main Outcome Measures: PCMH components perceived to provide benefit to the individual patient receiving care and the level of PCMH implementation at each respective practice.

Results: Seventy-eight providers in 37 practices saw 1093 patients and completed 1016 surveys. There was wide variation among the perceived benefits of the 18 PCMH components ranging from 9% for group visits to 66% for electronic prescribing. Perceived benefit was higher for patients presenting with a chronic problem. There were decreased implementation rates and less perceived benefit for some PCMH elements, including group visits, pre-visit huddles, secure email and extended access. Among clinics where PCMH elements had been implemented, there were higher rates of perceived benefit.

Conclusions: Rural providers perceived patient benefit for numerous components of the PCMH. Some elements had low rates of perceived benefit. There is a need to consider which PCMH elements are truly required and relevant in rural practice and which elements may be optional. Our findings reveal that rural practices share PCMH aspirations including commitment to quality, safety, outcomes, cost reduction, and patient and provider satisfaction.
**PROJECT TITLE:** Healthcare Disparities for the Deaf Culture

**Thematic Area:** Humanities, Social Science and Education

**Mentor:** Cordelia Rosenberg  
**Mentor Department:** JFK Partners

**Abstract:**

Background: The Deaf Community sees themselves as a culture with their own heritage, values, and customs. When they are instead viewed by medical staff as members of the hearing culture with a disability, their unique culture gets entirely dismissed and the potential for harm comes into play.

Objectives: The objectives of this paper are to review current literature and personal experiences available to determine how the Deaf view themselves as opposed to how they are viewed by others and how this can affect every area of their lives, specifically healthcare.

Methods: PubMed was searched for articles about experiences in treating the Deaf and about the Deaf culture. Three books written by deaf authors were also used to further elaborate on the view of medicine and the Deaf culture from their perspective.

Conclusions: The Deaf culture is not widely recognized by the hearing world, which can and has lead to mistreatment. There is a need for research into where discrepancies in treatment can be found in healthcare so changes can be made to assure they receive the best care possible within the context of their culture.
**Project Title:** "The MCAT Cooperative, Pilot Program" Eliminating financial barriers for students underrepresented in health care.

**Thematic Area:** Humanities, Social Science and Education

**Mentor:** Allegra Melillo  
**Mentor Department:** Family Medicine

**Abstract:**

There is significant research showing improved healthcare outcomes for underrepresented minority (URM) patients when cared for by URM physicians. This has been one of the major drivers behind government, healthcare and education efforts to increase the URM physician workforce. The Medical College Admissions Test (MCAT) score is a highly influential variable in URM M.D. and D.O. applicant matriculation. The high cost of current commercial MCAT preparation courses may pose a barrier for URM students. This two-year study developed and assessed a novel low-cost MCAT preparation pilot program to recruit URM students and provide quality preparation as well as additional services to increase their competitiveness as applicants. Through three participant surveys, data was gathered to evaluate the efficacy of the program from February 26, 2012 until December 1st, 2013. The pilot program had 22% (N=51) URM survey participants, which was well above the 2013 national mean for URM applicants to medical school and demonstrates a possible increase in recruitment of URM students from the overall population. Students showed a median improvement of 6.00 points (N=12, std. dev. = 5.12) cumulatively from pre-course to actual MCAT scores while studying an average of 13.8 hours per week (N = 34). The mentoring and application assistance provided by pilot program was utilized by 85% (N = 34) of participants. There was substantial loss to follow-up (76%) making extrapolations from data questionable. Of note, the program was financially viable without external funding while being able to award multiple scholarships to URM and students with financial hardship. While further studies are needed to show statistical significance, there is the potential for this pilot program to be easily repeatable at multiple sites and appears to be a viable alternative to commercial MCAT preparation programs. Programs such as this one could potentially become a contributor to increasing competitiveness of URM applicants.
ABSTRACTS

Mohapatra, Upasana

**Project Title:** C-STAHR

**Thematic Area:** Public Health and Epidemiology

**Mentor:** Tillman Farley

**Mentor Department:** Family Medicine

**Abstract:**
Project Title: Biodegradable Fixation of the Orbital Rim after Lateral Orbitotomy

Thematic Area: Clinical Science

Mentor: Brett Davies

Mentor Department: Ophthalmology

Abstract:

Biodegradable Fixation of the Orbital Rim after Lateral Orbitotomy

Brett W. Davies, MD, MS; Reid A. Mollman, BS; Mithra O. Gonzalez, MD; Eric M. Hink, MD; Vikram D. Durairaj, MD, FACS

Oculofacial Plastic and Orbital Surgery, Department of Ophthalmology, Department of Otolaryngology-Head and Neck Surgery; University of Colorado Hospital, Aurora, CO. University of Rochester Medical Center, Rochester, NY

Purpose:

To describe our experience with repair of the lateral orbital rim with poly-L/DL-lactic acid (PDLLA) biodegradable plates using ultrasonic pin fixation after lateral orbitotomy with bone flap.

Methods:

We retrospectively reviewed all patients who underwent a lateral orbitotomy with bone flap for biopsy of orbital tumors at our institution from January 2010 through May 2013. All patients underwent an orbitotomy by either a lateral eyelid crease incision or lateral canthotomy/cantholysis approach. A lateral bone flap was fashioned in the usual manner, extending from the fronto-zygomatic suture down the lateral rim for approximately 2 cm. The bone flap was repaired in each case with either a 6 or 7 hole biodegradable PDLLA plate and secured with ultrasonic PDLLA pin fixation.

Results:

Twenty-two patients were identified who underwent a lateral orbitotomy with bone flap. Of these patients, eight were repaired with PDLLA plates. The average age of the patients with PDLLA bone flap fixation was 55 years (range 5-85). Average follow up time was 12.5 months (range 3-42). Indications included 4 lacrimal gland tumors, 2 intraconal tumors, and 2 lateral orbital tumors. Final diagnosis included lymphoma (2), squamous cell carcinoma (1), neuroblastoma (1), amyloid (1), fibrous tissue (1), sarcoidosis (1), and idiopathic orbital inflammation (1). 3 patients had edema of the surrounding soft tissues after surgery, all resolved by post op month 3. There were 2 cases of transient temporal
numbness that resolved by post op month 1. There was one case of ptosis and one case of lower eyelid ectropion requiring surgical repair. There were no cases of vision loss, extraocular motility deficit, infection, or need for removal of the implant prior to absorption.

Conclusions:

PDLLA biodegradable plates with ultrasonic pin placement provide a safe, effective means for lateral rim fixation after orbitotomy with bone flap.
ABSTRACTS

Moser, Emily

Project Title: Continuous Glucose Monitoring in C-Peptide Positive Adult Patients with Type 1 Diabetes Treated with Sitagliptin

Thematic Area: Clinical Science

Mentor: Satish Garg

Mentor Department: Barbara Davis Center for Diabetes

Abstract:

Objective:

This study evaluated the effects of sitagliptin, a DPP-IV inhibitor approved for the treatment of type 2 diabetes, in adult patients with type 1 diabetes in improving glucose variability indices determined by continuous glucose monitoring (CGM). The previously published manuscript in Endocrine Practice describes the primary and secondary endpoints. This report specifically describes the subset of C-peptide positive patients.

Methods:

This investigator-initiated, double-blind, randomized-parallel 20-week study enrolled 141 subjects, with a subset of 85 patients who wore blinded CGM for 5 separate 7-day periods. Subjects received either sitagliptin 100 mg/day or matching placebo for 16-weeks following a 4 week run-in phase. This subset evaluation analyzed the CGM data from both C-peptide positive and negative patients determined by the highly sensitive Quanterix assay in those receiving sitagliptin and placebo at baseline and at 16 weeks.

Results:

Mean age, gender distribution, BMI and duration of diabetes were similar between the two groups at baseline. The proportion of patients with positive C-peptide on the new assay were similar in the placebo and treatment groups (45% and 54%, respectively, p=0.43). Among C-peptide positive patients, there was a trend towards improvement in mean glucose (-10.1 mg/dL ± 36.5 vs. 6.4 mg/dL ± 29.8. p=0.14), and percents of time spent in hyperglycemia (-5.7 ± 18.7 vs. 4.6 ± 15.5, p=0.07) and within target glucose range (3.3 ± 17.5 vs. -3.0 ± 14.3, p=0.23). C-peptide positive patients had a significantly higher time spent in hypoglycemia (2.3 ± 4.9 vs. -1.8 ± 5.6, p=0.02).

Conclusions:

We conclude that C-peptide positive patients with type 1 diabetes treated with sitagliptin had a trend towards improving glucose variability indices with a significant increase in hypoglycemia.
ABSTRACTS

Nacht, Jacob

Project Title: Interhospital transfers from U.S. emergency departments: implications for resource utilization, patient safety, and regionalization

Thematic Area: Public Health and Epidemiology

Mentor: Adit Ginde, MD, MPH        Mentor Department: Emergency Medicine

Abstract:

Background: Increased interest in regionalization and patient safety has focused attention on the practice of interfacility transfer from the ED. While ED transfer has been described in geographically limited studies of select conditions (e.g., myocardial infarction, stroke, trauma), the practice has not been previously described nationally for the breadth of presentations of transferred patients.

Objectives: We sought to describe the demographic and clinical characteristics of patients transferred from US EDs and the reasons for their transfer.

Methods: We performed a retrospective, cross-sectional analysis of the 2002-2009 National Hospital Ambulatory Medical Care Survey. We compared characteristics of patient visits that had the ED disposition of transfer or hospital admission. Additionally, we analyzed reason for transfer for available years (2005-2008). Weighted analyses produced nationally representative estimates, and chi-square test was used to make bivariate comparisons.

Results: From 2002-2009, 1.7% (95%CI, 1.5-1.8) of ED visits were transferred to another facility. Transferred patients were more likely to be &lt;18 years old than admitted patients (18% vs 7%; p&lt;0.001); to be male (54% vs 46%; p&lt;0.001); to have Medicaid (21% vs 14%, p&lt;0.001) or self-payment (14% vs 8%, p&lt;0.001) as a primary source of payment; to have a visit related to injury (42% vs 21%, p&lt;0.001); and to be from an ED in a non-metropolitan service area (27% vs 12%; p&lt;0.001). Among transferred patients, 25% (95%CI, 23-27) received 4-6 diagnostic tests and 36% (95%CI, 34-39) received ≥7 diagnostic tests prior to transfer; 52% (95%CI, 49-54) had diagnostic imaging; and 19% (95%CI, 18-21) had cross-sectional imaging. Of the patients transferred in 2005-08, 48% (95%CI, 43-53) were transferred for a higher level of care, and 30% (95%CI, 26-35) were transferred for psychiatric care.

Conclusion: Transfer of ED patients was relatively rare, but was more common among children, males, Medicaid and self-pay patients, injured patients, and rural patients. Diagnostic testing, including advanced imaging, was common prior to transfer. Nearly half of transfers were for a higher level of care. Since transfer is resource-intensive and a potential patient safety issue, interventions such as telemedicine and refining EMS triage criteria may reduce the need for transfer and warrant further investigation.
ABSTRACTS

Ojima, Claire

Project Title: The contribution of family physicians to intrapartum care in rural and critical access hospitals in Colorado

Thematic Area: Public Health and Epidemiology

Mentor: Mark Deutchman  Mentor Department: Family Medicine

Abstract:

Background: Traditionally the role of rural care has been filled by family physicians. This holds true for the provision of maternity care, including prenatal, intrapartum, and postpartum care for rural women. The last decades have seen a steady decline in family physicians who provide maternity care, which is especially concerning for rural women, whose risks of complications increase with the distance they must travel for prenatal and intrapartum care. Colorado is largely a rural state, and is susceptible to these worrisome trends.

Aim: The aim of this study is to identify the contribution of family physicians to intrapartum care in rural Colorado in the hopes that it will contribute to decisions for future training and recruitment of physicians to fill the growing gap of rural maternity care.

Methods: 25 rural and critical access hospitals in Colorado were identified as providing intrapartum care. They were contacted via phone or email and administered a survey (figure 2) asking for the breakdown of number of deliveries by type and specialty.

Results: Twenty-two of the twenty-five rural hospitals continue to deliver intrapartum care, and there was an 81.8% response rate. Of all rural and critical access hospitals (CAHs) that deliver babies, 47.2% are family physicians contributing to 27.1% of all deliveries. However, when examining the most rural and underserved regions of Colorado, by including only CAHs or excluding resort towns, family physicians role is much more critical. In these regions family physicians represent roughly 70% of all physicians providing intrapartum care contributing to a total of approximately 50% of all deliveries in these regions.

Conclusions: Despite national and local trends describing family physicians declining contribution to maternity care, family physicians continue to play a vital role in the most remote and underserved regions of rural Colorado. If family physicians were to stop delivering intrapartum care, 50% of the state would have limited access to intrapartum care, leading to increased risks to the mother and infant. Continued efforts are needed to train family physicians in maternity care and recruit them to rural regions of Colorado.
**Project Title:** Pre-Antiretroviral Therapy Screening for Tuberculosis, Serum Cryptococcal Antigen, and Kaposis Sarcoma in Rural Uganda: Primary Outcomes of the Kiboga-Fogarty Cohort Study

**Thematic Area:** Global Health

**Mentor:** Yukari Manabe  
**Mentor Department:** Division of Infectious Diseases, Johns Hopkins University

**Abstract:**

**Background**

In sub-Saharan Africa, high levels of mortality (8-26%) during the first year on antiretroviral therapy (ART) are largely due to opportunistic infections (OIs) caused by tuberculosis (TB) and Cryptococcus neoformans. These pathogens each cause 20% of deaths in patients starting ART. The ability to effectively diagnose and treat OIs that present soon after starting ART is essential to reducing mortality as national programs work towards the UN goal of 15 million people on ART by 2015.

**Methods**

We followed a cohort of HIV-infected, ART-naïve adults at Kiboga District Hospital in rural Uganda with CD4 counts \(\leq 250\) cells/μL. All subjects underwent screening for TB and Kaposis sarcoma (KS), and those with CD4 \(\leq 100\) also had cryptococcal antigen (CrAg) screening. Treatment for detected TB (RHZE x 8 months) or CrAg (fluconazole 800 mg x 4 weeks) was initiated, followed by ART two weeks later. We compared incidence of TB, cryptococcal meningitis (CM), and mortality over 6.5 months of follow-up to a historical cohort who initiated ART at the same hospital in the year prior.

**Results**

Of 540 participants enrolled, pre-ART screening detected 56 (10.4%) with prevalent TB, 12 (6.7% of those with CD4 count \(\leq 100\)) with positive serum CrAg, and 13 (2.4%) with KS. There were 39 deaths (7.2%) during 6.5 months of follow-up, occurring at a rate of 15.6 (95% CI, 11.4-21.3)/100 PYAR. Post-ART, 14 (2.6%) patients were diagnosed with TB and only one patient died of CM. By comparison, the historical cohort (n=289) had 21 cases of post-ART TB (7.3%, p < 0.001) and 21 deaths (7.3%, 15.0 deaths/100 PYAR, p = 0.981). Death rates were significantly higher among subjects with TB, CrAg positivity, or KS compared to subjects without these diagnoses. In multivariate analysis, significant risk factors for mortality were male sex (HR, 2.70; CI, 1.19-6.12; p 0.018) and severe anemia with baseline Hb £ 8.5 mg/ dL (HR, 3034.00; CI, 19.86-4.65x10 3 ; p &lt;0.001).

**Conclusion**
Pre-ART screening for OIs detects many prevalent cases. Due to the quality of the data in the pre-intervention historical cohort, we did not show a mortality benefit to screening. The rate of incident TB after ART decreased significantly with screening.
ABSTRACTS

Phipps, Ashley

Project Title: Outcomes of penetrating trauma to the torso at a tertiary referral centre in an under resourced health system

Thematic Area: Global Health

Mentor: David Richards
Mentor Department: Emergency Medicine

Abstract:

Background and Objectives: Trauma is the second leading cause of death in South Africa. Much of this trauma is attributed to penetrating injuries, particularly stab wounds. The aim of this study is to determine the outcome of penetrating trauma to the torso, utilising specific outcome markers in an under resourced health system.

Setting: Tygerberg Academical Hospital Trauma Centre.

Methods: Retrospective chart review of patients with isolated penetrating trauma to the torso, between ages of 18 to 79 years, over a 50-week period. 875 patient records were enrolled.

Results: Of the 875 patients sampled, 94% were male and 64% under the age of 30. 16% required a CT scan, 9,6% formal ultrasound, and 94,9% plain radiographs. 20% of stab wounds required surgery. Mean admission to theatre time interval was 34.5 hours. 9% Received blood transfusions (mean 4.3 units/patient). 62% Transfused patients also received FFPs. 61% of patients were discharged home, 7% referred to their referring hospitals, 16% admitted to TAH, and 2% died within seven days. The average length of stay was 4,6 days. 14% of patients had unobtainable outcomes due to missing patient records data.

Conclusions: Patients sustaining penetrating trauma (largely due to stabbing) places a high burden on Cape Towns health system. A large proportion of these patients require blood products, imaging investigations and surgical interventions. More future research is necessary to facilitate injury prevention initiatives and optimise our trauma centres clinical governance to improve our patient overall outcomes.
Project Title: Contributions of the University of Colorado School of Medicine to the Primary Care Workforce

Thematic Area: Humanities, Social Science and Education

Mentor: Mark Deutchman  Mentor Department: Family Medicine

Abstract:

BACKGROUND AND OBJECTIVES:

Our country has a primary care shortage, and the medical field faces the difficult task of producing physicians dedicated to generalist medicine. Medical Schools have for years overestimated the percentage of graduates entering primary care. We aim to clarify the discrepancy between the percentage of graduates deemed as primary care doctors and those that actually enter careers in primary care from the University of Colorado School of Medicine (CUSOM). We then suggest changes that CUSOM could implement to increase the number of graduating students eventually entering careers in primary care. We hope that this institution as well as others will take this data to realize this discrepancy and use it to motivate change.

METHODS:

Residency match data from the CUSOM 2003-2009 was used to classify graduates as nominally primary care or non-primary care based on their residency upon graduation from medical school. We defined nominal primary care as those who matched in Family Medicine (FM), Internal Medicine (IM), IM-Primary, Pediatrics and Med-Peds. We located all CUSOM nominally primary care graduates at their current practice location to determine whether their actual career was in primary care. In our research, we compare the nominal and actual primary care graduates, and examine this data broken down by specialty.

RESULTS:

During the study period of 2003-2009, while 47.7% of graduates nominally entered primary care, only 18.7% CUSOM graduates eventually practiced primary care.

CONCLUSIONS:

The number of graduates from the University of Colorado School of Medicine that eventually enter careers in primary care is significantly lower than would be expected based on the reported numbers at graduation.
ABSTRACTS

Ragole, Thomas

Project Title: Lack of tonotopic organization of the auditory cortex in schizophrenia

Thematic Area: Clinical Science

Mentor: Don Rojas Mentor Department: Psychiatry

Abstract:

Background: Disorganization of tonotopy in the auditory cortex has been described in schizophrenia. Subjects with schizophrenia show little to no spatial organization of responses to different tone frequencies in the auditory cortex. Previous studies have called into question the use of MEG and the M100 response to assess tonotopy. This study seeks to replicate prior results of tonotopic disorganization in schizophrenia compared to healthy controls.

Methods: The tonotopic organization for 400 Hz and 4,000 Hz sound in 19 patients with schizophrenia and 11 comparison subjects was determined using MEG by examining the M100 auditory-evoked magnetic field dipole in primary auditory cortex. The equivalent current dipole locations were then mapped and compared.

Results: The previous result of a lack of tonotopy in subjects with schizophrenia was partly replicated. In control subjects, the 400 Hz tone auditory evoked field was found anterior to the 4000 Hz in the primary auditory cortex.

Conclusions: The lack of tonotopic organization of the auditory cortex is replicable in patients with schizophrenia and suggests that the architecture underlying tonotopy in the auditory cortex is disordered. This result suggests possible alteration in the organization of the auditory cortex, which may in turn influence higher order cognitive processes by altering the perception of incoming auditory stimuli.
Project Title: Evaluation of the Impact of an Interprofessional Health Elective

Thematic Area: Humanities, Social Science and Education

Mentor: Paritosh Kaul  Mentor Department: Pediatrics

Abstract:

Patients and providers face numerous barriers in the delivery of quality health care to refugees resettling in the United States. Moreover, considerable value has been demonstrated in interprofessional education (IPE) as a means of positively affecting patient care. For the first time, an interprofessional refugee health elective, Refugee Health I, was held on the Anschutz Medical Campus, enrolling dental, medical, nursing, physical therapy, and public health students. Pre- and post-elective surveys were conducted to assess the course's impact on student awareness of refugee health and attitudes surrounding IPE. Overall, Refugee Health I served to increase knowledge of common refugee health issues as well as awareness of the influence of cultural perceptions and logistical barriers on health-seeking behavior, compliance and health outcomes in the Colorado refugee population. The course did not significantly improve perceptions of IPE as a component of the effective treatment of refugees, with high scores noted at baseline.
Project Title: Communication Cards: A Novel Quality Improvement Intervention to Better Elder Patient Provider Communication on the University of Colorado Hospitals Acute Care for the Elderly Unit

Thematic Area: Humanities, Social Science and Education

Mentor: Ethan Cumbler Mentor Department: University of Colorado Acute Care for the Elderly

Abstract:

In the Acute Care for the Elderly (ACE) unit, which exclusively cares for elderly patients over the age of 70 years, patient satisfaction with nurse and physician communication is consistently high. However, the unit also operates under the assumption that we can always be better. One such attempt at improving patient-provider communication was the recent trial run of a communication card project. Derived from ideas generated through appreciative inquiry events held from July through November 2013 on the unit, this project distributed cards that patients could use to write down questions for their providers, giving them another form of communicative access to ACE staff. What we found was that, in targeting a small number of patients not already fully satisfied with communication on the ACE unit, the cards were not highly utilized. However, the process itself appeared to work for the cognitively intact who wished to make use of the cards. We encountered difficulty, however, in reaching our cognitively diminished population, for whom the communication barriers seen in elderly patients are most prominent. This, of course, prompts us to continually strive to ensure better patient-provider communication for our patient population. What follows is a discussion of the challenges healthcare providers face when communicating with elderly patients, a description of our intervention and its effects, and some thoughts on how we can continue to improve.
ABSTRACTS

Roy, David

Project Title: Patient Health as Top Priority
Thematic Area: Public Health and Epidemiology
Mentor: Jeremy Long
Mentor Department: Medicine

Abstract:
PURPOSE: The following is an evidence-based discussion about payment reform within the healthcare system of Colorado. The discussion draws from papers, presentations, and professional opinions regarding payment reform in Colorado, in other regions of the United States, and internationally. An outline of why payment reform is imperative both fiscally and morally is presented. This paper draws on these national and international examples and attempts to tailor the discussion for applicability to Colorado, specifically.

METHODS: PubMed and Google Scholar were searched with the terms Universal Healthcare in “Colorado Universal Healthcare Systems,” “Universal Healthcare Systems in the United States,” and “Universal Healthcare Systems Worldwide.” Additionally, references from presentations by Harold Miller and William Hsiao were explored to ensure that all forms of universal healthcare both in the US and internationally were represented. Finally, expert opinions and research from Colorado organizations, such as CIVHC and Colorado Medical Society president Dr. Michael Pramkenko MD, among many others, were consulted for this academic white paper presented to Senator Irene Aguilar in 2011.

CONFLICT OF INTEREST: This paper is the final product of an unpaid summer internship in 2011 with Senator Irene Aguilar, MD. It is representative of the authors opinions, which may or may not overlap with those of the Senator Aguilar.

ACKNOWLEDGEMENTS: Special thanks for the advice, guidance, and mentorship from Senator Irene Aguilar, Dr. Jeremy Long, Dr. Mark Earnest, Dr. Rita Lee, Dr. Cathy Battaglia, and Linda Salas.

ABSTRACT: The following is an evidence-based discussion about payment reform within the healthcare system of Colorado. The discussion draws from papers, presentations, and professional opinions regarding payment reform in Colorado, in other regions of the United States, and internationally. An outline of why payment reform is imperative both fiscally and morally is
presented. This paper draws on these national and international examples and attempts to tailor the discussion for applicability to Colorado, specifically.

PubMed and GoogleScholar were searched with the terms Universal Healthcare in ~Colorado Universal Healthcare Systems, ~Universal Healthcare Systems in the United States, and ~Universal Healthcare Systems Worldwide. Additionally, references from of presentations by Harold Miller and William Hsiao were explored to ensure that all forms of universal healthcare both in the US and internationally were represented. Finally, expert opinions and research from Colorado organizations, such as CIVHC and Colorado Medical Society president Dr. Michael Pramkenko MD, among many others, were consulted for this academic white paper presented to Senator Irene Aguilar in 2011.

The recommendations that resulted from this inquiry into literature, local organizations, and professional opinions included the following: hold a competition with a financial reward to develop a standardized EMR software protocol (Roth), implement a uniform medical claims processing system (Hsiao), assign or create an agency to facilitate accessible (Hsiao), accessible transparent documentation of cost and quality (CIVHC), make grants and loans to small, rural, and inner-city providers to help costs of installing new healthcare models (CIVHC), establish a track at the University of Colorado School of Medicine where student acceptance is contingent on promise to serve in a primary care capacity (LEADS), change the term Patient-Centered Medical Home to a phrase such as patient-doctor partnership (LEADS), and help providers divide liability (Gold).

The study is an attempt to collect pertinent information for the implementation of healthcare in the state of Colorado. The lack of rigorous, systematic methods is obviously the component of the paper most lacking. However, despite these less scientific methods, there is still a need to gather information from the available resources in order to start a discussion.
Project Title: Anticipating Medicaid Expansion to Adults without Dependent Children (AwDC): Physician Perspectives and Experiences

Thematic Area: Public Health and Epidemiology

Mentor: Cathy Battaglia  Mentor Department: School of Public Health

Abstract:

Medicaid in Colorado was expanded to low-income, non-elderly adults without dependent children (AwDC) under a 2009 state regulation and under 2010 national healthcare reform known as the Affordable Care Act. This study aimed to understand possible barriers to access of healthcare for newly insured after implementation of these Medicaid expansions by evaluating the experiences and perspectives of Colorado primary care physicians (PCPs) working with uninsured AwDC and patients covered by Medicaid. The study included 17 PCPs across Colorado and involved confidential interviews using a qualitative interview tool. Results revealed common themes among participating PCPs, including heterogeneous awareness of Medicaid expansion and differing perspectives of healthcare utilization by uninsured patients compared with patients covered by Medicaid. All physicians commented on the limitation of Medicaid payments, which was incongruent with PCPs' ethics to provide care to all patients regardless of insurance status.
Project Title: Arteriopathy, D-Dimer, and Risk of Poor Neurologic Outcome in Childhood-Onset Arterial Ischemic Stroke

Thematic Area: Clinical Science

Mentor: Tim Bernard Mentor Department: Pediatric Neurology

Abstract:

Objective: To assess whether acute findings of cerebral arteriopathy, large infarct, and acutely elevated plasma D-dimer levels are independently prognostic of poor long-term neurologic outcome as measured at 1 year post-event in children with arterial ischemic stroke (AIS).

Study design: Sixty-one patients with childhood-onset (i.e., >28 days of life) AIS were enrolled in a single-institution cohort study at Childrens Hospital Colorado between February 2006 and June 2011. Data on demographic and diagnostic characteristics, antithrombotic treatments, and outcomes were systematically collected.

Results: Cerebral arteriopathy and D-dimer levels > 500 ng/mL (a measure of coagulation activation) were identified acutely in 41% in 31% of the cohort, respectively. Anticoagulation was administered in the acute period post-event in 40% of the children, in the subacute period in 43%, and in the chronic period in 28%. When not receiving anticoagulation, patients were routinely treated with aspirin 2-5 mg/kg once-daily for a minimum of one year. Death, major bleeding (including intracranial hemorrhage), and recurrent AIS were infrequent. The Pediatric Stroke Outcome Measure at 1 year showed poor outcome in 54% of the children. Acute cerebral arteriopathy and elevated D-dimer level were identified as putative prognostic factors for poor outcome; after adjustment for D-dimer, arteriopathy was an independent prognostic indicator (OR=19.0, 95%CI=1.6-229.8; P=0.02).

Conclusions: Arteriopathy and coagulation activation are highly prevalent in the acute period of childhood AIS. Although recurrent AIS and intracranial hemorrhage were infrequent in our cohort, one-half of children experienced a poor neurologic outcome at one year, the risk of which is increased by acute arteriopathy. Substantiation of these findings in multi-institution cohort studies is warranted, toward risk-stratification in childhood-onset AIS.
Project Title: Stool Samples and Their Relevance to Refugee Health

Thematic Area: Clinical Science

Mentor: Jamaluddin Moloo
Mentor Department: Internal Medicine, Nuclear Cardiology, Cardiac CT Angiography

Abstract:
Objective

To test the hypothesis that cardiovascular disease (CVD) risk factors are similar in nondiabetic (non-DM) adolescents compared with those with type 1 diabetes (T1D) in the most insulin-sensitive (IS) tertile, and that CVD risk factors are more atherogenic with decreasing IS in adolescents with T1D.

Study design

IS for adolescents with T1D (n = 292; age = 15.4 ± 2.1 years; duration = 8.8 ± 3.0 years, hemoglobin A1c = 8.9% ± 1.6%) and non-DM controls (n = 89; age = 15.4 ± 2.1 years) was estimated using the model: logeIS = .64725 ˆ 0.602032 (waist [cm]) ˆ 0.09779 (hemoglobin A1c [%]) ˆ 0.00235 (triglycerides [mg/dL]). CVD risk factors (blood pressure, fasting total and low- and high-density lipoprotein-cholesterol (HDL-c), high sensitivity C-reactive protein, and body mass index z score) were compared between all non-DM adolescents and those with T1D in the most IS tertile, and then examined for a linear trend by IS tertile in adolescents with T1D, adjusted for sex, race/ethnicity, and Tanner stage.

Results

Estimated IS was significantly lower in adolescents with T1D compared with those without (T1D = 7.8 ± 2.4, non-DM = 11.5 ± 2.9; P
**ABSTRACTS**

Stanley, Gail

**Project Title:** Teen Pregnancy Prevention in Colorado: A LEADS Student Community Advocacy Project

**Thematic Area:** Public Health and Epidemiology

**Mentor:** Rita Lee  
**Mentor Department:** Internal Medicine

**Abstract:**

Objective: A review of teen pregnancy prevention programs in Colorado with a focus on health education models, target population, outcomes measured, and barriers to implementing and sustaining successful programs.

Background: The 2010 Department of Regulatory Agencies sunset review of Colorado's Teen Pregnancy and Dropout Prevention Program demonstrated that overall teen birth rates had declined. However, teen birth rates continue to be disproportionally elevated in rural counties with large minority and/or low income populations.

Methods: I performed a systematic review of teen pregnancy prevention programs in Colorado with a focus on health education models, target population, and success at preventing teen pregnancy. Outcomes measured were teen participation, community support, teen sexual behaviors, contraception use, and pregnancy rates. I also performed a review of successful pregnancy prevention programs throughout the United States of America to compare health education models utilized, target populations, and outcome measurements. I used key informant interviews of providers and community leaders to determine awareness of the Teen Pregnancy and Dropout Prevention Program and to discover barriers preventing implementation of pregnancy prevention programs.

Results: The health education models used most often by teen pregnancy prevention programs are the Health Belief Model and the Social Cognitive Theory. The most successful programs target urban and minority youths and provide culturally appropriate materials and services. Many counties in Colorado have adequate infrastructure for reproductive services and have implemented robust pregnancy prevention programs. However, only two providers participate in the Medicaid funded Teen Pregnancy Prevention and Dropout Program due to extensive application correspondence times and the challenge of providing specific program services mandated for funding. In rural communities, barriers to implementing teen pregnancy prevention programs successfully include: low awareness of the Teen Pregnancy and Dropout Prevention Program and limited infrastructure to integrate youth-friendly services and clinics into existing reproductive services.

Conclusion: The CDC considers teen pregnancy as one of its Winnable Battles. Nationally there are numerous providers, organizations, and communities implementing successful teen pregnancy prevention programs based on the Health Belief Model and/or the Social Cognitive Theory and provide comprehensive reproductive health education. The majority of successful programs target
specific communities and provide culturally tailored material and services. Colorados Teen Pregnancy and Dropout Prevention Program provides Medicaid reimbursement for teen pregnancy prevention services. The program is underutilized due to a lack of awareness of the program, limited rural infrastructure for teen health services, and delays in reimbursement distributions.
**Project Title:** Quantitative Evaluation of International Short Term Medical Mission Trips Using a Standardized Survey Tool

**Thematic Area:** Global Health

**Mentor:** Jennifer Whitfield Bellows  **Mentor Department:** Global Health / Emergency Medicine

**Abstract:**

Thousands of short term medical mission trips depart from the United States every year with the goals of providing medical care for underserved populations, improving health outcomes in international areas, creating cultural exchanges, and educating medical providers and students. While these trips are very common, there is very little published research regarding the efficacy, safety, benefits, and disadvantages of these trips. This project created and piloted a survey that can be given to participants of short term medical mission trips with the goal of collecting data on efficacy and benefits of these trips. The survey focuses on six major factors that include logistics, participant preparedness, participant experience/education, medical impact, local value, and sustainability. Preliminary results from this pilot survey demonstrate that the survey is a viable tool for quantitatively studying and comparing short term medical mission trips.
ABSTRACTS

Trenbeath, Zachary

Project Title: Pieces of a Successful Exchange

Thematic Area: Public Health and Epidemiology

Mentor: Mark Earnest     Mentor Department: Internal Medicine

Abstract:

When the Patient Protection and Affordable Care Act (PPACA) passed on March 23, 2010, one of the most significant changes made was the necessity of the creation of a Health Insurance Exchange (HIEX), a new method in many states for consumers to purchase insurance. The ACA mandates that each state either create their own HIEX or use a federally created HIEX. The state of Colorado decided that it would create its own HIEX called the Health Benefits Exchange that Colorado residents would use to purchase insurance.

Our project began soon after this decision had been made and very little had been done to prepare for the creation and implementation of the Colorado HIEX (the Exchange). There had been little communication between governmental bodies and health advocacy organizations to attempt to collaborate and organize efforts towards the creation of the Exchange. Therefore, we investigated the projects and workgroups around the state that involved the Exchange and identified gaps where further work needed to be done to ensure a successful implementation. Suggestions were made to fix these gaps included engaging providers in the exchange, addressing consumers knowledge of benefits and insurance, determining how to bring people to the exchange, regional education and special needs evaluation, and engaging underwriters and plan providers.
Project Title: Magic in Medieval Anglo-Saxon Medicine: A re-examination and comparison of common medical sources

Thematic Area: Humanities, Social Science and Education

Mentor: Marjorie Levine-Clark
Mentor Department: History

Abstract:

Magical elements of medical practice have long been of interest to historians and physicians alike. Such magic was decried as witchcraft, sorcery and demonic by Aelfric and his contemporaries. Yet, magical cures are seen in all of the extant Anglo-Saxon medical texts. This paper defines categories of magic and calculates how common they were in each of the Old English texts. The texts and their magical components are compared with regards to both number and category of magico-medical remedies. This is then used as a framework to analyze the practice of magical Anglo-Saxon medicine and how it evolved over the course of approximately 800 CE to 1000 CE.
ABSTRACTS

Wei, Peng-Peng

Project Title: Sleep Spindles and Auditory Sensory Gating: Two Measures of Cerebral Inhibition in Preschool-aged Children are Strongly Correlated

Thematic Area: Clinical Science

Mentor: Sharon Hunter  Mentor Department: Psychiatry

Abstract:

This study investigates the potential relationship between two measures of cerebral inhibition, sleep spindles and P50 sensory gating, in a pediatric population. Sleep spindles are maximally active during Stage 2 sleep; P50 sensory gating is maximally active during wakefulness and REM sleep. Correlation of these two measures would suggest that, despite being active during different phases of sleep, both measures reflect similar underlying brain functioning. Data from 13 preschool-aged children who were admitted to a pediatric clinical research center for an overnight sleep study are presented. Electroencephalographic (EEG) data were collected between midnight and 6:00 a.m. Sleep staging was performed offline by visual inspection. A ratio (S2/S1) of evoked responses to paired auditory stimuli was calculated during REM sleep. EEG data were then subjected to a band-pass filter (11-15 Hz) to aid in spindle detection and analysis. Measurements of spindle duration, peaks per cycle, and mean inter-peak interval (intra-spindle density) were obtained and compared to P50 sensory gating from corresponding participants. S2/S1 ratios were negatively correlated with spindle duration (r= -.715, p=.006) and intra-spindle density (r= -.728, p=.005). There was a trend toward higher S2/S1 ratios being associated with fewer peaks per spindle (r= -.546, p=.053). These results suggest that in four-year-olds, two established physiological measures of sensory gating are correlated despite being maximally active during different stages of sleep. This suggests that there is an overlap in brain mechanisms underlying each gating mechanism.
ABSTRACTS

Weigang, Tyler

Project Title: Pediatrician Referral Practices After an Abnormal Developmental Screen

Thematic Area: Clinical Science

Mentor: Ayelet Talmi  Mentor Department: Psychiatry and Pediatrics

Abstract:

OBJECTIVES: To examine referral patterns of pediatric primary care providers after an abnormal screening result on the Ages and Stages Questionnaire (ASQ) and explore potential reasons for under-referral to Early Intervention.

METHODS: Data were abstracted from an electronic medical record for children younger than three years old who were seen in an urban, pediatric residency-training clinic for a well child check (WCC). All WCC with completed screenings between 10/2/2008-3/31/2010 (n=3255) were queried. Records with delayed ASQ scores were manually reviewed (n=537). The final analysis included only the first WCC with documentation of an abnormal ASQ score (n=340).

RESULTS: The majority of children with abnormal screening results (57.6%) were not referred for further evaluation. Delays in communication (P<0.001), gross motor (P=0.01), or personal social (P<0.05) developmental domains were more likely to generate referrals than delays in the fine motor or problem solving domains of the ASQ. The number of domains with delays (P=0.001) and having a categorically eligible condition (P<0.01) were also found to predict referrals.

CONCLUSIONS: Despite increased developmental screening, many children who may be eligible for Early Intervention services are not referred for evaluation by their primary care providers. Our study suggests that delays in certain developmental domains are less likely to generate referrals for evaluation. Additionally, our study suggests that many pediatric providers take a watchful waiting approach rather than proactively referring a child for further evaluation in the face of abnormal screening results.
ABSTRACTS

Young, Kristen

Project Title: An Assessment of Faculty Development Needs for the Patient-Centered Medical Home (PCMH) in Colorado Family Medicine Residencies

Thematic Area: Humanities, Social Science and Education

Mentor: Doug Fernald Perry Dickinson  Mentor Department: Family Medicine

Abstract:

Background and objectives: Primary care residencies throughout the United States face challenges from multiple changes they are undergoing, including PCMH transformation. The goal of the project was to identify specific faculty development issues with PCMH implementation.

Methods: This project was a part of the evaluation of the Colorado Family Medicine Residency PCMH Project. Purposively selected faculty from each of the nine residencies were interviewed via a semi-structured format. Based on these interviews all faculty were subsequently invited to complete a web-based survey in 2011 and 2013. The survey was based on 12 domains of PCMH competencies. Survey results from 2011 and 2013 were compared using the means of the summed domains and using chi-square analysis.

Results: In 2011 the majority of faculty felt that they were somewhat proficient across all categories and feeling that they were less proficient in coordination of care and some of the competencies specifically linked to an electronic health record and their ability to conduct population management. In 2013 chi-square analysis showed no significant differences (at a 90% confidence interval) on 32 of the 37 competencies. Significant differences were observed in five items, all but one being positive, but each within a different PCMH domain suggesting little significant change in faculty proficiency over two years.

Conclusion: In the context of major practice and curricular implementation of PCMH, there are still gaps in faculty proficiency in key portions of the model. Population management is one of the greatest struggles in the implementation of this model of care, perhaps in part because key aspects are not well supported by each residencys hospital system.
ABSTRACTS

Badeau, Austin

Project Title: Reconstruction and Characterization of Composite Mandibular Defects Requiring Double Skin Paddle Fibular Free Flaps

Thematic Area: Clinical Science

Mentor: Frederic Deleyiannis  Mentor Department: Dept. of Surgery

Abstract:

Objective: Fibular free flaps are the preferred method for reconstruction of composite lateral mandibular defects. This reconstructive technique is limited by the skin paddles inability to freely rotate when attempting to fill 2 poorly aligned defects. Reconstruc-tive surgeons have been exploring multiple methods of creating 2 independent skin paddles based on the same peroneal blood supply. We present a variation of these tech-niques. Method: Our patient with a history of squamous cell carcinoma presented with a left retromolar recurrence and osteoradionecrosis of the mandible with a draining anterior sinus tract. The combination of these defects warranted further composite re-section with fibular free flap reconstruction. Results: A subperiosteal dissection was performed to create 2 separate septocutaneous skin paddles based on the same peroneal blood supply. This dissection and discard of proximal fibula provided the rotational freedom needed for the 2 skin islands to fill both a lateral oral defect and anterior cutaneous defect. Conclusion: Although similar reconstructive methods have been re-ported in the literature, the characterization of defects benefiting from these techniques is scarce and unclear. We describe clear and concise characteristics of these defects, which should be meaningful to the reconstructive surgeon when considering operative technique.
ABSTRACTS

Bartsch, Jeffrey

Project Title: Social Media, Nutrition, and Physical Activity Preferences Among Medical Students

Thematic Area: Humanities, Social Science and Education

Mentor: Michele Doucette  Mentor Department: Family Medicine

Abstract:

Purpose:

The first goal of this study is to establish the social media preferences of the first and second-year medical students at the University of Colorado School of Medicine. An analysis as to which social media platform/networking tools medical students would utilize has previously not been explored. The second goal is to determine what types of nutrition, physical activity, and healthy lifestyle information and resources would be most useful in addressing the problem of declining “healthy-living habits of medical students. The final purpose of this study is to determine whether a social network website dedicated to providing nutrition, physical activity, and healthy lifestyle information and resources targeted for health professions students is a valuable resource for medical students.

Methods:

First and second-year medical students at the University of Colorado School of Medicine were recruited to complete a survey to assess their social media preferences, as well as what types of resources they would like to see utilized by the CU Department of Family Medicine in conjunction with their new nutrition platform. The initial survey was conducted during the 2011-2012 academic year. A follow-up survey was then administered during the 2013-2014 academic year to a similar cohort of those same students in their third and fourth years of medical school.

Results:

136 out of 320 (42.55%) first and second-year students completed the pre-survey, while 88 out of 320 (27.5%) third and fourth-year students completed the post-survey. We found that the most commonly used Web 2.0 platform were wikis (90.8% read them during pre-survey, and 84.5% during post-survey), with Facebook use as a close second (86.9% used during pre-survey and 76.3% during post-survey). When asked if they would utilize Web 2.0 resources that are meant to supplement the nutrition curriculum, 73.2% would be at least somewhat likely to use a social networking website. In the pre-survey, we found that students desire a variety of “healthy-living resources such as information about physical activity and health recommendations (70.8%), “healthy eating patterns information (70%), exercise plans (61.5%), recipes (38.5%).

Conclusions:
The data from the pre- and post-surveys show that there is a desire from medical students at the University of Colorado SOM to supplement the nutrition curriculum with Web 2.0 technology. It also shows that the most commonly used Web 2.0 technology is wikis, with Facebook as a close second. It is also clear that students desire a variety of healthy-living resources to combat the previously established problem of declining physical activity levels and eating habits of medical students. We also found that the majority of medical students at the University of Colorado believe an online forum to communicate with classmates regarding coursework is desired, but it remains to be seen whether an online discussion board or social media platform is the best way to do that.
Project Title: High LDL and very low HDL as a screening for cholesterol ester storage disease

Thematic Area: Clinical Science

Mentor: Matthew Taylor  Mentor Department: Adult Clinical Genetics

Abstract:

Cholesteryl ester storage disease (CESD) is an inherited lipid disorder caused by lysosomal acid lipase deficiency and represents one of 2 phenotypes, the other being the more severe and uniformly fatal Wolman disease. While the prevalence of CESD is very low, it is thought to be an underdiagnosed disease due to its nonspecific presentation of hepatomegaly with lipid profile derangements, commonly with elevated serum transaminases. While efforts are underway to enroll patients in clinical trials of recombinant lysosomal acid lipase for the treatment of CESD, the challenge has been in identifying patients with the disease. An academic medical center laboratory database was queried to identify patients with elevated serum transaminases and elevated low density lipoprotein with low high density lipoprotein. 104 records were then analyzed for other indicators of possible CESD. No patients were positively identified as having CESD however efforts to re-examine liver biopsies for possible missed diagnoses are ongoing.
ABSTRACTS

Bhatt, Paraag

Project Title: Parathyroid Imaging with Simultaneous Acquisition of Tc-99m-Sestamibi & I-123: The Relative Merits of Pinhole Collimation and SPECT-CT

Thematic Area: Clinical Science

Mentor: Phillip Koo
Mentor Department: Department of Nuclear Medicine

Abstract:

Objective: To determine the relative accuracy of 3 parathyroid imaging protocols: 1) single time point simultaneous acquisition of Tc-99m-sestamibi and I-123 images with pinhole collimation in the anterior and bilateral anterior oblique projections 2) single time point simultaneous acquisition of Tc-99m-sestamibi and I-123 images with SPECT-CT tomography, and 3) the combination of protocols one and two. All 3 protocols included perfectly co-registered subtraction images created by subtracting the I-123 images from the Tc-99m-sestamibi images, plus large field of view parallel hole collimator images of the neck and upper chest.
Project Title: Thrombocytopenia in the critically-ill patient: A case report and overview of the evaluation and management of heparin-induced thrombocytopenia

Thematic Area: Clinical Science

Mentor: Christiane Thienelt

Mentor Department: Hematology

Abstract:

Case report of an 82-year-old male found to have a new LAD artery occlusion complicated by cardiogenic shock during percutaneous coronary intervention requiring the placement of an intra-aortic balloon pump and anticoagulation with abciximab. The patient's course was then complicated by profound thrombocytopenia while in the medical intensive care unit. The differential diagnosis will be discussed with an emphasis on the pretest probability of heparin-induced thrombocytopenia (HIT), followed by an extensive review of the complications and management of this specific form of thrombocytopenia.
Ehlers-Danlos syndrome (EDS) is a heterogeneous group of heritable connective tissue disorders. Classic findings result from defects in collagen synthesis and conversion, and manifest as skin hyperextensibility, joint hypermobility, hypotonia, vascular elasticity, and generalized tissue fragility. Mutations in several genes have been associated with Ehlers-Danlos syndrome, including COL3A1 and COL5A2 (type three and type five collagens, respectively). Identified phenotypes typically result from deletions or substitutions in these genes. There are no previous reports of a duplication of either COL3A1 or COL5A2 associated with EDS phenotype. We present a child with dysmorphic features, severe intellectual disabilities, and an EDS phenotype. Microarray analysis revealed a gain of thirty-four BAC clones (RP11-272E3â’RP11-235L22), located at 2q24.3â’2q32.2, a region containing COL3A1 and COL5A2, both located on 2q32. Microarray analysis and fibroblast testing might be considered in patients with EDS, especially those patients who also have dysmorphic features or intellectual disability, to help confirm that duplications in collagen genes may contribute to this phenotype.
Project Title: The Psychiatric Manifestations of Wilson's Disease

Thematic Area: Humanities, Social Science and Education

Mentor: Jackie Glover  Mentor Department: Center for Bioethics and Humanities

Abstract:

WD is a rare autosomal recessive disease that occurs worldwide. Inability to transport copper out of the hepatocyte results in hepatic accumulation of copper and subsequent injury. Over time, copper is released into the circulation and becomes deposited in other organs, most notably the brain, kidneys, and cornea. Clinical features classically include liver failure and neurological deficits. The psychiatric manifestations are less common and less well known, but patients can present with psychiatric symptoms alone, resulting in significant delays in diagnosis and appropriate treatment. The current literature largely consists of case reports and cohort studies and is reviewed here.
ABSTRACTS

Chaudhuri, Munir

Project Title: Familial Idiopathic Scoliosis in Males; a Sequencing Analysis of the SFI1 Gene on Chromosome 22q.

Thematic Area: Clinical Science

Mentor: Nancy Miller  Mentor Department: Orthopedics

Abstract:

A Genome wide association study previously demonstrated a significant linkage between the SFI1 gene on Chromosome 22 and familial idiopathic scoliosis specifically in men. Idiopathic scoliosis (IS) has long been considered to be a genetic disorder and though many genetic studies have been done, there is no clear consensus determining causative mutation(s). Given the fact that none of these previous studies have investigated the role of SFI1 in IS, we have chosen to investigate a potential linkage between the two by sequencing the 33 exons and 1 SNP.

Methods

Using NCBI genbank we identified the sequence for SFI1. Separating the gene into its 33 exons and 1 SNP, we used Primer Express to develop unique forward and reverse primers to sequence these regions of interest on SFI1. After primers were developed, we tested them on our own DNA using a touchdown PCR protocol, followed by gel electrophoresis and analysis to determine if our primers amplified the DNA as expected. If it did, we cleaned the product up with ExoSap and sent it to the UCHSC sequencing lab. Once sequenced we verified the sequence for accuracy using the CodonCode Aligner software.

Results

We were able to develop primers for all the regions of interest except the forward primers for exons 5-6, and 15. We had difficulty placing a unique primer on or near poly A and poly T regions that we located close to the beginning of the exons.

Conclusion

SFI1s link to IS remains unclear. By developing accurate primers for almost all the regions of interest on SFI1 we have set the stage for mutational analysis to be conducted between affected Males and their unaffected family members as controls. SFI1 has interactions with other genes that have been
studied with regards to IS, most interestingly ESR1. Our hope is that a mutational analysis can be conducted, which may implicate mutations in SFI1 in the IS process that in turn could lead to better understanding and treatment of the disorder.
Project Title: Transcription factor BCL11B is overexpressed in Group 3 medulloblastoma and interacts with MYC to promote a growth advantage in medulloblastoma cells

Thematic Area: Basic Science

Mentor: Rajeev Vibhakar    Mentor Department: Pediatrics

Abstract:

Introduction

Medulloblastoma are a heterogeneous group of highly malignant brain tumors that most often affect children. Outcomes among children vary widely and MYC amplification is the single most important molecular indicator of poor prognosis. Here we analyzed gene expression in high MYC expressing tumors and compared these results to low MYC expressing controls to identify new therapeutic targets for high MYC expressing medulloblastoma.

Methods

We analyzed whole genome mRNA expression in 5 primary tumor samples with high MYC expression and LC/A histology compared to that in 14 low MYC expressing tumors with classic histology to identify the zinc-finger transcription factor BCL11B as upregulated in high MYC expressing LC/A tumors. This observation was externally verified in a dataset of over 90 primary medulloblastoma tumor samples. We then utilized chromatin immunoprecipitation and fluorescent immunohistochemistry to identify a likely physical interaction between Bcl11b and Myc. Finally, used RNAi to examine the impact of BCL11B silencing on cell colony formation and transfection of C17.2 cells with BCL11B expressing vector to study the effects of BCL11B overexpression on cell growth in soft agar.

Results

Here we show that BCL11B is over expressed in high MYC expressing primary tumor samples and that this is characteristic of Group 3 tumors (p<6.63E-3). We identify a likely physical interaction
between Bcl11b and c-Myc using chromatin immunoprecipitation and fluorescent immunohistochemistry. Finally, we show that targeted disruption of BCL11B by RNAi strongly impairs medulloblastoma tumor cell colony formation (P<0.0001, n=3), and that transformation of C17.2 cells with BCL11B is sufficient to induce cell growth in soft agar.

Conclusion

The negative prognostic value of MYC amplification in medulloblastoma has been well established clinically. These results indicate that the zinc finger transcription factor BCL11B may be an important player in MYC driven oncogenesis. Moreover, these results demonstrate a physical interaction between c-Myc and Bcl11b that has not been previously described. The specific mechanisms of this interaction remain to be elucidated, however it seems clear that BCL11B overexpression is both necessary and sufficient to support medulloblastoma tumor cell growth and proliferation. Thus, Bcl11b or its signaling partners may represent novel therapeutic targets in high MYC expressing medulloblastoma.
ABSTRACTS

Demars, Andrew

Project Title: Retained palmar foreign body presenting as a late hand infection: proposed diagnostic algorithm to detect radiolucent objects

Thematic Area: Clinical Science

Mentor: Kyros Ipaktchi Mentor Department: Orthopedics

Abstract:

Abstract Background: Penetrating injuries to the hand can compromise important anatomic structures, and persisting foreign objects may become a source of infection. Foreign body intrusions into the hand are among the most common injuries to the upper extremity seen in the Emergency Department. Radiolucent organic objects, as well as a few higher density inorganic materials such as plastic, present a diagnostic challenge and are routinely missed using standard radiography. While the literature describes the use of high-frequency ultrasound as an adjunct to conventional diagnostics, to our knowledge, no formal algorithm has been published.

Case presentation: We describe a case of incomplete wooden splinter removal, presenting as a late midpalmar abscess five months after the initial injury, and requiring two subsequent surgical explorations for definitive treatment. This case has led us to implement a formal diagnostic pathway including high-frequency ultrasound at our institution. We contrast this presentation with a subsequent case involving a much smaller wooden palmar foreign body that was easily identified under ultrasound and removed without sequelae.

Conclusion: Many hand injuries are caused by low density, radiolucent foreign bodies. These objects can easily escape traditional evaluation in the emergency room including standard radiography. We present an algorithm implementing high frequency ultrasound to minimize the risk of missing radiolucent penetrating foreign objects in the hand.
ABSTRACTS

Ducey, Stephen

Project Title: Malnutrition Trends in a Rural Guatemalan Community

Thematic Area: Global Health

Mentor: Sue Hammerton Mentor Department: Pediatrics (Denver Health)

Abstract:

Malnutrition is a major problem in Guatemala. It causes lasting effects on intellectual development, which can be halted by early intervention. In coordination with the San Benito health team, we have analyzed the weights of children under five in a community of the El Pet region, looking for trends in the prevalence of malnutrition. The team has collected approximately five years of weights from community visits. We have analyzed the data for Z-score based on weight-for-age. When compared by month, there appears to be a trend towards a higher prevalence of underweight children during July and August, the time between the harvests, although this trend is not statistically significant. We will show this data to the team to help them more effectively deliver supplemental nutrition to children in need.
ABSTRACTS

Emmott, Margaret

**Project Title:** Student Leadership Transitions in CBPR: Lessons Learned

**Thematic Area:** Public Health and Epidemiology

**Mentor:** Tillman Farley  
**Mentor Department:** Family Medicine

**Abstract:**

Despite widespread use of CBPR, there is a lack of research on the best practices for leadership transitions in CBPR partnerships led by health professional students. Community and Students Together Against Healthcare Racism (C-STAHR), is a local CBPR partnership led by members of the East Denver and Aurora communities, 2040 Partners for Health, and health professional students from the University of Colorado Anschutz Medical Campus. This poster reviews some of the major accomplishments of C-STAHR, our successful strategies for self-reflection and leadership transitions, and lessons learned with student leadership transitions in student-led CBPR projects. Specifically, there are templates for group evaluation and the results of a qualitative group survey administered via phone interviews. Perceived strengths of our transition process include: maintenance of core partnership structure, ongoing involvement of first generation students, dedication to relationships, strong initial transition framework, diversity and dedication of new students, and a strong institutional home. Weaknesses of our transition with suggested approaches to addressing them include: meeting content and length; communication strategies; increased training; and the limited availability of students in clinical clerkships.
Project Title: Medication Adherence in Denver's Immigrant Community

Thematic Area: Public Health and Epidemiology

Mentor: Jamaluddin Moloo

Mentor Department: Dept. of Radiology

Abstract:

Rationale: Medication non-adherence in the United States contributes to an estimated loss of $100 billion a year and contributes to 33-69% of annual hospitalizations, poor quality of life and even death.

Objectives: Our goal was to identify the factors that regulate patient non-adherence to medication at a clinic serving poor, uninsured and underinsured, and immigrant populations.

Methods: Eligible patients were given standard hospital care and survey was administered by asking questions directly to patients. We sought to identify associations between English proficiency, patient demographics, patient resources, accuracy of knowledge, and health literacy with medication adherence. Medication adherence was assessed using a 3-part questionnaire inquiring about patient forgetfulness or difficulty remembering to take medications over different time periods. Differences among the means were analyzed for significance by t-tests for continuous outcomes and X^2 tests or Fishers exact test for categorical variables.

Results: A total of 50 adult patients participated in the study. Patients with good English proficiency were more literate about their health. Also, there was an association between English proficiency and one of three measures of medication adherence, days in the past two weeks with missed pills. However, we interestingly found patients with a language barrier to more compliant to their medication regimen, opposite what we would have predicted.

Conclusions: A large percent of the patient population are emigrants with poor English proficiency, thus our findings suggest that there is support of native language and education in the clinic.
ABSTRACTS

French, Kristen

Project Title: Outcomes of Penetrating Trauma to the Torso at a Tertiary Referral Centre in an Under Resourced Health System

Thematic Area: Global Health

Mentor: Richards Mentor Department: Emergency Medicine

Abstract:

Background and Objectives: Trauma is the second leading cause of death in South Africa. Much of this trauma is attributed to penetrating injuries, particularly stab wounds. The aim of this study is to determine the outcome of penetrating trauma to the torso, utilising specific outcome markers in an under resourced health system.

Setting: Tygerberg Academical Hospital Trauma Centre.

Methods: Retrospective chart review of patients with isolated penetrating trauma to the torso, between ages of 18 to 79 years, over a 50-week period. 875 patient records were enrolled.

Results: Of the 875 patients sampled, 94% were male and 64% under the age of 30. 16% required a CT scan, 9.6% formal ultrasound and 94.9% plain radiographs. 20% of stab wounds required surgery. Mean admission to theatre time interval was 34.5 hours. 9% Received blood transfusions (mean [RDM1] 4.3 units/patient). 62% Transfused patients also received FFP. 61% of patients were discharged home, 7% referred to their referring hospitals, 16% admitted to TAH, and 2% died within seven days. The average length of stay was 4.6 days. 14% of patients had unobtainable outcomes due to missing patient records data.

Conclusions: Patients sustaining penetrating trauma (largely due to stabbing) places a high burden on Cape Town health system. A large proportion of these patients require blood products, imaging investigations and surgical interventions. More future research is necessary to facilitate injury prevention initiatives and optimise our trauma centres clinical governance to improve our patient overall outcomes.
ABSTRACTS

Frydendall, Emily

**Project Title:** Creation of a Community Health Needs Assessment Model for Colorado Area Health Education Centers

**Thematic Area:** Public Health and Epidemiology

**Mentor:** Mark Deutchman  
**Mentor Department:** Family Medicine

**Abstract:**

Context: Community Health Needs Assessments (CHNA) is an evolving tool allowing healthcare systems/facilities to better align services and outreach programming with community needs. Recent enactment of the Patient Protection and Affordable Care Act (PPACA) mandates all tax-exempt hospitals to complete CHNA every three years. It is anticipated that the standard-of-practice - if not regulations - will be for most federal or tax-exempt healthcare organizations to complete these assessments. The six separate, publicly funded Colorado Area Health Education Centers (AHEC) have undergone CHNA infrequently and with varying methodologies.

Objective: This study set out to critically analyze the evolution of CHNA, with special consideration given to the new PPACA mandates, in hopes of applying a useful and reproducible model for Colorado AHECs.

Methods: Evaluation will take place of a pilot Southwestern Colorado AHEC needs assessment and a recently published University of Colorado Hospital CHNA compliant with PPACA guidelines. Specifically, each will be analyzed through the window of 1) population selection, 2) health statistic and qualitative data, 3) prioritization of needs, 4) strategies for and implementation of interventions, and 5) wide accessibility of report. This data then informed the creation of a reproducible CHNA model - compliant with PPACA guidelines - for the individual Colorado AHECs. Lastly, the proposed model was trialed with a needs assessment of Colorados Centennial AHEC.

Results: Analysis of the two prior CHNA represented two different models of conducting CHNA. The University of Colorado Hospital model reflects a CHNA in compliance with PPACA yet for a specific health institution vs. a regional approach. The Southwestern AHEC model represented an older model of CHNA which reflects expansive data collection with more emphasis on recognizing health disparities and less emphasis on strategies for improving health needs. Consequently, the model created for the six Colorado AHEC models more closely represents compliance with the PPACA guidelines since AHECs are federally funded entities, as well as having greater emphasis on creating and implementing strategies for improving the health of the AHEC regions people. As such the Colorado AHEC model places emphasis on creating strategies specific to each AHEC region to improve health of the community. After trialing the model with the Centennial region, it appears that this is a workable model that could be reproduced in the other AHEC regions.
Conclusions: CHNA can be extremely valuable tools and are becoming more standardized since the enactment of the PPACA. As such the Colorado AHECs would benefit by regular CHNA that are 1) compliant with PPACA regulations, 2) customizable to each Colorado AHEC region, and 3) take into consideration specific programs currently ongoing in each AHEC.
Abstract:

Clinical Decision Support (CDS) systems are being used with increasing frequency in numerous healthcare settings, with the goal of improving patient care, outcomes, and practitioner performance. This study examines the impact of a nursing CDS protocol in the pediatric emergency department on the care of febrile infants 28 days old with a temperature 38.0°C, with a specific focus on time-to-antibiotic administration. This impact was assessed by comparing a retrospective analysis of the pre-implementation phase and a prospective analysis following the implementation of the CDS protocol. The results of this study showed no statistically significant difference in the primary outcome measure of time-to-antibiotic administration between the two groups. A statistically significant decrease in length-of-stay by 51 hours after adoption of the CDS protocol was found, however, which carries with it numerous economic and psychosocial benefits. While this CDS protocol failed to accomplish the primary goal of decreasing time-to-antibiotic administration, it demonstrated promising improvements in secondary outcome measures; as such, future research into the utilization of CDS is certainly warranted.
Project Title: Utility of treating pulmonary nocardiosis in the adult cystic fibrosis population

Thematic Area: Clinical Science

Mentor: Milene Saavedra
Mentor Department: Department of Medicine

Abstract:

Background: The utility of treating positive Nocardia species sputum cultures in cystic fibrosis is of unknown significance and there are currently no clear guidelines. The objectives of this study were to identify characteristics which may be important in the consideration as to whether Nocardia species should be treated in CF patients.

Methods: We conducted an incident case-control study in which we analyzed the impact of directed antibiotic therapy against Nocardia species found in the sputum of 15 adult CF patients from a single accredited CF center, over the course of 5 years. FEV1 was employed as the clinical indicator of lung function.

Results: Subjects in the treated group had greater FEV decline at the time of their Nocardia identification compared to those who were not treated. However, at a 6 month time interval following identification of Nocardia in the sputum, the relative changes in both groups were not significant. The treatment group was found to have a wider array of Nocardia species isolates. All of the subjects were found to have co-infections, including; Pseudomonas aeruginosa, methicillin sensitive and resistant Staphylococcus aureus and Burkholderia cepacia. Nontuberculosis mycobacterium was recovered in a disproportionate percentage of untreated subjects. In the treated group a majority demonstrated evidence of consolidation on chest imaging while in the untreated group the majority of subjects did not.

Conclusions: Nocardia virulence in CF patients may be species specific and use of 16s rDNA sequencing for identification may help guide clinical evaluation and treatment. Also, a relationship between Nocardia species and nontuberculosis mycobacterium was observed and requires further study.
ABSTRACTS

Hudon, Robert

Project Title: The Golden Bowtie Award: Fostering Mentorship and Meaning on the Wards

Thematic Area: Humanities, Social Science and Education

Mentor: Jessica Campbell
Mentor Department: Medicine

Abstract:

Positive mentorship opportunities that are informal, non-clinical, and non-academic are a recognized weakness in medical education today. Changes in academic health centers since the 1990s have caused an increasingly fragmented experience during core clerkships where medical students risk disconnection from faculty mentors, residents, and patients (Stevens et al). This includes overall mentorship experiences. Possibilities for students to interact with their seniors in unique ways are challenging within the constraints of the demands that both doctors and students face, yet relationships with more experienced physicians helps inform students decisions and trajectory. The Golden Bowtie Award (formerly the Rick Albert Prize) was created in 2011 to address this dilemma through reward and engagement. Teams consisting of a medical student, a resident, and an attending who submit the best vignette are given prizes, but more importantly, through hierarchal collaboration are provided the chance to develop mentor/mentee relationships while also advancing professional aims. Medical students who participated in these teams were then interviewed to determine the efficacy of the prize to improve or alter medical students sense of mentor/mentee relationship, along with their perceptions of their vocation and future aims. The prize resulted in a 16-fold increase in abstract, poster, and conference submissions among trainees at Denver Health Hospital its first year and a 23-fold increase between its inception and the second year. Students reported unique and positive interactions with their seniors, more rewarding clinical experiences, and ongoing mentorship with senior team members. The implication is that similar team-based awards offer positive and engaging experiences for medical students that can improve their clinical experiences while creating relationships with more experienced physicians in a way that supports well-balanced, contemplative, and caring physicians more capable of providing quality care and service to patients and community.
ABSTRACTS

Hulings, Joedy

Project Title: Community and Students Together Against Healthcare Racism (C-STAHR): Organizational Development and Research Processes from Years 1-4

Thematic Area: Public Health and Epidemiology

Mentor: Tillman Farley

Mentor Department: Family Medicine

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

Jones, Kenneth

Project Title: Location Type and Provision of Bystander CPR in Public Cardiac Arrests

Thematic Area: Public Health and Epidemiology

Mentor: Comilla Sasson  Mentor Department: Emergency Medicine

Abstract:

Background: Approximately 20% of all out-of-hospital cardiac arrests (OHCA) occur in a public location. However, little is known about how the immediate environment affects the likelihood of arrest or of bystander intervention. Our objective was to categorize the location of public OHCA events by the nature of the building in which they took place, and to compare the prevalence of bystander intervention - in the form of both CPR and AED use - between different building types.

Methods: This was a secondary analysis of the Cardiac Arrest Registry to Enhance Survival (CARES) dataset from Nov 1st, 2005 through December 31st, 2009. The study included only victims whose OHCA occurred in a public venue and who had an AED used by either a layperson or medical personnel. Street addresses and latitude/longitude information were correlated with satellite and street-level imagery and property/tax records in order to assign the location into one of 47 categories of building/establishment.

Results: During the study period, 758 OHCA events met the inclusion criteria. Locations with the greatest total number of arrests included retail shopping facilities, fitness facilities, offices, hotels and industrial facilities, followed by airports, schools, gambling establishments, and places of worship. Locations with the highest rates of bystander intervention included athletic facilities (78%), airports (76%), and schools/colleges (75%). Locations with low intervention rates included places of worship (47%), shopping facilities (44%), gambling establishments (39.4%), and hotels/motels (31.0%).

Conclusions: Location types having high absolute numbers of arrests were found to be similar to those noted in previous literature. Different public environments have significantly different rates of bystander CPR and AED use. A correlation exists between the likelihood of bystander CPR and of bystander AED use. Building types in which OHCA layperson intervention rates are high may represent models for public education; those with lower response rates may indicate locations worthy of focused public education and training campaigns.
ABSTRACTS

Jones, Dylan

Project Title: Short Course Fractionated Stereotactic Radiosurgery for Children with Diffuse Intrinsic Pontine Glioma

Thematic Area: Clinical Science

Mentor: Todd Hankinson

Mentor Department: Neurological Surgery

Abstract:

Introduction: Diffuse Intrinsic Pontine Glioma (DIPG) is associated with abysmal clinical outcomes, with reported median survival ranging from 7-11 months. Conventional fractionated radiation remains the standard treatment, requiring patients and families to commit substantial time and resources to receiving care. In order to reduce the temporal burden on patients and families, we employed a regimen of fractioned stereotactic radiosurgery (fSRS).

Methods: Single institution review of children with DIPG treated with fractionated stereotactic radiosurgery. Parameters assessed included patient demographics, treatment regimen, and survival outcomes.

Results: Seven children with lesions that were clinically and radiographically consistent with DIPG were treated. The regimen in all children included Linac-based fractionated stereotactic radiosurgery at a dose of 25Gy in 5 fractions. The median age at diagnosis was 4.5 years (range 2.6-7.7). Four patients (57.1%) had histologically confirmed high grade glioma, the remaining 3 did not undergo biopsy. The mean duration of treatment was 6.71 days (range 5-11d). The mean time from diagnosis to initiation of treatment was 11 days (range 6-14d). There were no severe complications attributed to fSRS. All patients completed the treatment regimen. Two children underwent re-irradiation at the time of progression.

Discussion: Short course fSRS appears to be safe and offers logistical benefits in the treatment of DIPG. Although our cohort was small and presented at a relatively young age, this preliminary evaluation indicates that a regimen of 25Gy in 5 fractions may not achieve equivalent survival outcomes as established regimens of conventional radiotherapy. Further studies with a more aggressive regimen should be considered.
ABSTRACTS

Kark, Jonathan

Project Title: AltitudeOmics: The Integrative Physiology of Human Acclimatization to Hypobaric Hypoxia and Its Memory on Reascent

Thematic Area: Basic Science

Mentor: Andrew Subudhi Mentor Department: Emergency Medicine

Abstract:

An understanding of human responses to hypoxia is important for the health and well-being of millions of people worldwide, who visit, live or work in the hypoxic environment encountered at high altitudes. It is also important for the additional millions who suffer from hypoxia secondary to various disease processes. But in spite of dozens of studies over the last 100 years, the basic mechanisms controlling acclimatization to hypoxia remain largely unknown. And now we are learning that acclimatization may persist after weeks to months spent at low altitude, but again the mechanisms of how this occurs are unknown. The AltitudeOmics project aimed to bridge this gap. We characterized acclimatization using measures of ventilatory and hematological acclimatization, symptoms of acute mountain sickness (AMS), cognitive function and physical performance in 21 subjects as they acclimatized to 5260 m over 16 days. We then focused on the relatively unexplored area of acclimatization memory by having subjects re-ascend to 5260 m after either 7 (n=14) or 21 (n=7) days spent at low altitude (1525 m). During acclimatization we observed partial ventilatory and hematological acclimatization, complete resolution of AMS, and improvements in cognitive function and submaximal exercise performance. On reascent, substantial memory of acclimatization was seen for AMS and submaximal exercise performance, and to a lesser extent for cognitive function for up to 7 days, with some effects lasting for up to 21 days. We also observed that indices of ventilatory and hematological acclimatization did not account for the improvement in AMS, cognitive function or submaximal exercise capacity nor for acclimatization memory during reascent. Taken together these findings expand our knowledge of acclimatization and its memory with potential benefits for anyone facing the challenges of hypoxia.
ABSTRACTS

Lewis, Jeffrey

Project Title: A Novel Pharmacovigilance Data Mining Platform for the FAERS Database

Thematic Area: Public Health and Epidemiology

Mentor: David Kao   Mentor Department: Cardiology

Abstract:

Background: Various statistical methods, both Frequentist and Bayesian, have been used successfully to detect adverse drug-event combinations (DECs) in spontaneous reporting systems like the FDA’s FAERS database. These methods, which may have disparate data setup and computing requirements, are often executed in isolation with many time-consuming, manual steps.

Objective: To develop a new software platform with automated capabilities for extracting and performing various statistical analyses of FAERS data, including the recently published multinomial Standardized Gamma approach.

Results: Calculated proportional reporting ratios (PRRs) for eight drugs and cardiac arrhythmias are consistent with previously published results. Executing the multinomial Standardized Gamma approach on the FAERS database correctly identifies previously known signals of disproportionate reporting (SDRs) for COX-2 inhibitors and myocardial infarction / stroke.

Conclusion: This new software platform effectively extracts and analyzes FAERS data for several statistical methods. The recently published multinomial Standardized Gamma approach appears to accurately identify SDRs when applied to the entire FAERS dataset.
ABSTRACTS

Neessen, Kori

Project Title: Realigning Educational Curriculum and the Realities of Clinical Practice in Wilderness Rangers

Thematic Area: Public Health and Epidemiology

Mentor: Tracy Cushing  Mentor Department: Emergency

Abstract:

Realigning Educational Curriculum and the Realities of Clinical Practice in Wilderness Rangers

John D. Anderson, MD 1,2 , Matthieu P. DeClerck, MD 1 , Kori Neessen, BS 2,  Tracy A. Cushing, MD, MPH 1,2

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The National Park Service (NPS) hosts 278 million visitors annually. Backcountry users tend to be more healthy, but many of the visitors in more easily accessible front country areas bring preexisting medical conditions that may require attention. While rangers have a broad curriculum that covers many aspects of trauma care, there is less focus on the management of medical problems. We examined the rates of traumatic vs. medical events in both the front and backcountry at Rocky Mountain National Park (RMNP) over a three year period to assess whether rangers see similar rates of medical and traumatic emergencies. We then performed a needs-assessment of the RMNP rangers as to what areas they felt their training curriculum might be deficient. We developed a curriculum based on these results and assessed changes in ranger competency with a pre- and post-test of medical problem management.

METHODS: Initially, the Annual Emergency Medicine Services (EMS) Reports collected by the NPS were used to determine rates of traumatic vs. medical events in RMNP from 2007-2009. In the second phase of the study, needs-assessment surveys were sent out to RMNP rangers addressing their previous training, commonly encountered pathology, and perceived knowledge of and comfort level dealing with traumatic and medical emergencies. Finally, a five hour curriculum on common medical emergencies was integrated into their recertification class. Pre-course and post-course tests were given to assess retention of knowledge.

RESULTS: Based on EMS report data over three years, park personnel responded to 407 total calls, of which 229 or 56.3% were medical and 178 or 43.7% were trauma related. 100% of participants in our survey, including medics and first responders, felt that their trauma training was adequate. However, no participant felt comfortable with all basic medical emergencies. Overall, participants felt either totally comfortable or moderately comfortable with only 70% of medical conditions. Rangers surveyed
felt least comfortable with gastrointestinal medical problems (56% felt moderately or totally comfortable) and these same personnel felt most comfortable with altitude related emergencies (78% either moderately or totally comfortable). The needs-assessment also revealed deficiencies in management of medical emergencies such as chest pain, shortness of breath, and diabetes. The additional curriculum lectures included these topics plus general obstetrics care and pediatrics among others. After institution of the curriculum, test scores on primary medical knowledge improved 11%.

CONCLUSION: National Park EMS providers must be prepared for traumatic incidents as well as medical emergencies. At RMNP, while the rangers felt comfortable in the management of traumatic injuries, the majority of providers in our study felt additional medical based training would be beneficial. Our findings demonstrate that focused changes in education can improve rangers medical knowledge. More research is needed to determine if a standardized curriculum with greater emphasis on medical topics would improve clinical outcomes within the National Park system overall.
ABSTRACTS

Osborne, Christina

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

Thematic Area: Clinical Science

Mentor: Samuel Dominguez
Mentor Department: Pediatrics- Infectious Diseases

Abstract:

Background: Acute gastroenteritis accounts for a significant burden of medically attended illness in children under the age of five.

Objectives: Define the epidemiology of viral gastroenteritis in children over a 3-year period in the United States.

Study design: Four multiplex real-time 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 Childrens Hospital Colorado.

Results: Of 1105 stool samples available, viral RNA/DNA was detected in 247 (26.2%) of 941 pediatric samples (median age = 2.97 years, 54% male) with 28 (3.0%) positive for more than one virus. Adenovirus, astrovirus, norovirus GI, norovirus GII, 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.

Conclusion: 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. Our data support the superiority of RT-PCR compared to EM for diagnosis of viral gastroenteritis.
ABSTRACTS

Paladino, Alexander

Project Title: Evaluating and Improving the Timeliness and Quality of Discharge Summaries Completed By Residents on the Medical Wards

Thematic Area: Clinical Science

Mentor: Darlene Tad-y

Mentor Department: Department of Medicine

Abstract:

The discharge summary is an important element of bridging the discontinuity between hospitalists and outpatient care providers. Studies suggest discharge summaries commonly lack critical information or are not completed in a timely manner, potentially leading to negative patient outcomes. An audit of discharge summaries compiled by medical residents at the University of Colorado Hospital found they frequently lacked required information. A survey of PCPs revealed only 28% receive discharge summaries most of the time prior to a patient's first follow-up visit. Interventions of auditing and feedback, printed reminder cards with required elements, and a didactic presentation on discharge summaries did not significantly improve discharge summary quality or timeliness. Transitioning from dictations to electronic discharge summaries showed significant improvement in components with specific fields on the EMR form.
Project Title: Morbidity of Tube Thoracostomy for Trauma in South African Tuberculosis and/or HIV Patients

Thematic Area: Global Health

Mentor: David Richards

Mentor Department: Emergency Medicine

Abstract:

Background: South Africa bears a disproportionately high burden of Mycobacterium tuberculosis (TB) infections, with an estimated prevalence of 795 cases per 100,000 persons (WHO, 2010). The effects of TB infection on the morbidity and mortality of penetrating chest trauma patients are unknown.

Methods: Retrospective chart review carried out by two teams of researchers over three-month periods in 2009 and 2010 (n=500, n=450 respectively) to evaluate demographic data, TB infection status, and clinical outcomes for patients presenting between 2008 and 2010 to the Casualty Department at GF Jooste Hospital in Cape Town, South Africa for management of acute penetrating chest injuries. Charts included were limited to patients who were 18 years or older and were treated with tube thoracostomy. Data on TB status was drawn from patient charts and cross-referenced to the national Electronic Tuberculosis Registry (ETR).

Results: Insufficient documentation of TB status significantly limited initial analyses, as data were only available for 85/500 (2009) and 18/450 (2010) patients. ETR data accounted for 21% of TB status data vs. 79% from patient charts. Overall, TB status was not recorded for 90% of enrolled patients.

Discussion: Given the high risk of comorbidities associated with TB infection, and the significant potential for affecting outcomes in patients with penetrating chest trauma, poorly documented TB status is a concerning finding. Subsequent studies are needed to address the reasons for this insufficiency of data and to implement strategies to improve TB status documentation.
ABSTRACTS

Pellinen, Jacob

Project Title: Mice with Altered Brain Lipoprotein Metabolism Display Maladaptive Responses to Environmental Challenges that May Predispose to Weight Gain

Thematic Area: Basic Science

Mentor: Robert Eckel

Mentor Department: Medicine

Abstract:

Background: Pre-obese 3-month old neuron-specific lipoprotein lipase (LPL)-depleted mice (NEXLPL-/-) mice have normal body weight, but become obese by 4.5 months. This series of experiments investigated responses to novel environment stimuli and acute sleep deprivation in pre-obese NEXLPL-/- mice, to test the hypothesis that neuron-specific LPL deletion alters normal adaptive metabolic responses to environmental challenges.

Methods: 3-month-old, age- and weight-matched, male NEXLPL-/- (n = 10) and wild-type (WT) (n = 10) mice, were housed in individual metabolic chambers with a 12-hour dark cycle that recorded food and water intake, locomotor activity, and calorimetry data in 12-minute intervals. First-time introduction to chambers at dark-onset led to novel environmental responses. Following acclimation and baseline recording, mice were sleep-deprived for 6 hours prior to dark onset before returning to chambers.

Results: NEXLPL-/- mice displayed a 1.5-fold greater increase in activity in response to a novel environment than the increase seen in WT controls (P = 0.0308), and a 2-fold greater increase in food intake following acute sleep deprivation (P = 0.0117). NEXLPL-/- mice averaged a 27% higher metabolic rate than WT mice throughout the experiments (P < 0.0001). Body weight, composition, and temperature did not differ between murine groups throughout the experiments. Levels of free fatty acid (FFA), insulin, glucose, and triglycerides (TG) were similar at the terminus between groups.

Conclusions: A deficiency in neuronal LPL signaling disrupts normal responses to novel environmental exposure and acute sleep deprivation, a maladaptive response that may contribute to weight gain in genetically predisposed mice.
ABSTRACTS

Rahimpour, Shervin

Project Title: Histone deacetylase inhibitors increase glucocerebrosidase activity in Gaucher disease by modulation of molecular chaperones

Thematic Area: Basic Science

Mentor: Allen Waziri  Mentor Department: Neurosurgery

Abstract:

Gaucher disease is caused by mutations of the GBA gene that encodes the lysosomal enzyme glucocerebrosidase (GCase). GBA mutations often result in protein misfolding and premature degradation, but usually exert less effect on catalytic activity. In this study, we identified the molecular mechanism by which histone deacetylase inhibitors increase the quantity and activity of GCase. Specifically, these inhibitors limit the deacetylation of heat shock protein 90, resulting in less recognition of the mutant peptide and GCase degradation. These findings provide insight into a possible therapeutic strategy for Gaucher disease and other genetic disorders by modifying molecular chaperone and protein degradation pathways.
Project Title: Molecular Pathogenesis of Insulin Resistance in Type 2 Diabetes

Thematic Area: Basic Science

Mentor: Dr. Timothy McGraw  Mentor Department: Biochemistry & Biochem in Thoracic Surg

Abstract:

[Confidential]
Project Title: Creation of an Oral Nerve Block Curriculum in the School of Medicine

Thematic Area: Clinical Science

Mentor: Mark Deutchman
Mentor Department: Family Medicine

Abstract:

Patients with dental and/or oral-related complaints frequently seek care from physicians rather than dentists. Physicians, often secondary to limited training, are frequently uncomfortable and lack the knowledge to effectively treat patients with these complaints. The administration of oral nerve blocks is a skill well known to dental providers that can provide patients with good pain relief for a variety of intraoral problems. It is unclear what knowledge medical providers have of this specific skill. As of now, there is no curriculum within the University of Colorado School of Medicine to teach oral anesthesia and dental nerve blocks. The purpose of this project was to develop an oral nerve block teaching curriculum that can be used to teach this skill to medical providers.
Project Title: Developing Home Visit Curriculum: A Medical Student Collaboration with the University of Colorado Family Medicine Residency Program

Thematic Area: Public Health and Epidemiology

Mentor: David Gaspar       Mentor Department: Family Medicine

Abstract:

The Physician Home Visit is an integral part of a Family Medicine resident training often considered to be an out dated service in medicine, the home visit can be of great value and benefit to both clinician and patient. Sufficient training and background education is required, however, if residents are going to get the most out of this required portion of their curriculum. A pilot curriculum has been developed and presented to the current 2nd year Family Medicine Residents at the University of Colorado Hospital. It is the desire that this curriculum will serve to more fully educate and engage these residents to benefit from their training visits and, furthermore, to consider incorporating appropriate home visits into their future practices. The instruction was researched, developed, and presented by a medical student researcher under the guidance of the residency program directors and faculty. The presentation will describe background information, rationale, and logistics and safety of performing physician home visits. This information has been gathered from multiple sources and collaboratively incorporated to be most applicable to practical implementation of home visits as a reasonable and beneficial component to the practice of Family Medicine.
Project Title: Severe Head Injury in Children: The Benefits of Liberal Imaging Outweigh the Risks of Ionizing Radiation from CT

Thematic Area: Clinical Science

Mentor: Denis Bensard
Mentor Department: Surgery

Abstract:

Background: Pediatric patients with closed head injury frequently undergo non-head computed tomography (CT) imaging to rule out concomitant injury. However, up to an estimated 1/500 of these children will develop a lethal cancer as a result. We examined the frequency and yield of CT body imaging in children with closed head injury.

Materials and Methods: A retrospective review was conducted of all patients age 15 and under who presented to a Level 1 pediatric trauma center with blunt injury, requiring trauma team activation and CT head, from 1/2006 to 8/2013. Patients were grouped by initial GCS score: I) 15, mild; II) 10-14, moderate; III) 3-9, severe. We compared the risk of undergoing a particular CT scan, and the yield of imaging in each group.

Results: A total of 139 children with blunt trauma and closed head injury were identified (mean age 7.5 ±4.9y; 59% male; ISS 12.6 ±11.3). 32% had at least one positive non-head CT. Patients with severe head injury (group III) were more likely to die than those in groups I or II (32% in group III, compared to 0% in groups I and II). Group III patients were also more likely to undergo CT imaging of the chest, spine and abdomen (p<0.05), but this imaging was no more likely to be positive than imaging in groups I or II.

Conclusions: Children suffering severe closed head injury are at considerable risk of associated injury. We suggest that the benefits of liberal CT imaging of these patients outweigh the potential risks of ionizing radiation.
Abstract:

Background: Ovarian cancer is often referred to as "the silent killer" because it is one of the most under-diagnosed and lethal forms of cancer in women. In 2010, the Centers for Disease Control acknowledged a lack of public awareness related to ovarian cancer, and called for more direct educational efforts for patients, the general public and healthcare providers alike. In early 2011, the Survival Storytelling Project (SSP) was conceptualized as a response to the CDC's call for increased educational efforts, and is one step on the road to improved survival for ovarian cancer patients in Colorado. The Colorado Ovarian Cancer Alliance (COCA) is one of the largest advocacy organizations for ovarian cancer patients in Colorado. By interviewing more than 20 members of COCA, the SSP reveals the priorities and perspectives of ovarian cancer survivors, and as such, captures the voice of an under-represented community in Colorado.

Methods: The SSP has two phases. Phase 1 is a documentary film divided into short segments and posted on the COCA website. The film serves as an educational tool for ovarian cancer patients and survivors, and allows them to teach the general public about their disease. Phase 1 addresses the CDC’s call for improved education for patients and the general public. Phase 2 is a qualitative analysis of the interview data, which aggregates individual stories into quantifiable information that can be used to educate healthcare providers about patient perspectives and preferences on illness, treatment, and quality of life. To date, basic-science information has not been well matched with an understanding of the priorities of women with ovarian cancer. The purpose of Phase 2 is to align patient and provider perspectives in order to improve care for ovarian cancer patients in Colorado. A four-level coding scheme was used to analyze the comprehensive dataset extracted from the interviews. The strategy was adopted from previous studies of qualitative health information. Two independent coders analyzed the data for thematic content, and the data was assessed for inter-coder reliability.

Results: Twenty-four women participated in the study (mean age 56.1 years). Two thirds of the participants were first diagnosed at FIGO Stage III or IV (N=16; 67%) After reviewing and coding the twenty-four 1-hour interviews there were 557 discrete ideas expressed by the participants. The 557 statements were divided into five major themes, represented by Level 1 Code: "Symptoms" (N=74; 13.3%), "Physician Behavior" (N=69; 12.4%), "Treatment" (N=175; 31.4%), "Coping Strategies" (N=176; 31.6%), and "Advice for Future Patients" (N=63; 11.3%). Sub-themes in Levels 2-4 were also extracted and coded accordingly.

Conclusions: Phase 1 of the SSP is a film project that will be launched in the Spring of 2014. Phase 2 allows healthcare providers in Colorado to compare their understanding of ovarian cancer development and survivorship with the views expressed by members of a prominent ovarian cancer advocacy organization in their state. By identifying common themes in patient narratives, the SSP
sheds light on patient priorities, and identifies areas of improvement relevant to their care. The SSP also challenges healthcare providers to identify the incongruities between their own views, and the patients’ perspectives on illness, treatment and quality of life. By treating patients as the experts in their own illness, the SSP explores an untapped educational resource and facilitates a unique form of patient-provider communication.
ABSTRACTS

Roth, Kinsey

Project Title: Pieces of a Successful Exchange: An assessment of projects, state-wide, concerned with the implementation, operation, and success of the Colorado Health Benefit Exchange

Thematic Area: Humanities, Social Science and Education

Mentor: Mark Earnest
Mentor Department: Medicine

Abstract:

When the Patient Protection and Affordable Care Act (PPACA) passed on March 23, 2010, one of the most significant changes made was the necessity of the creation of a Health Insurance Exchange (HIEX), a new method in many states for consumers to purchase insurance. The ACA mandates that each state either create their own HIEX or use a federally created HIEX. The state of Colorado decided that it would create its own HIEX called the Health Benefits Exchange (the Exchange) that Colorado residents would use to purchase insurance.

Our project began soon after this decision had been made and very little had been done to prepare for the creation and implementation of The Exchange. There had been little communication between governmental bodies and health advocacy organizations to attempt to collaborate and organize efforts towards the creation of the Exchange. Therefore, we investigated the projects and workgroups around the state that involved the Exchange and identified gaps where further work needed to be done to ensure a successful implementation. Suggestions were made to fix these gaps included engaging providers in the exchange, addressing consumers knowledge of benefits and insurance, determining how to bring people to the exchange, regional education and special needs evaluation, and engaging underwriters and plan providers.
ABSTRACTS

Scrimgeour, Laura

Project Title: Medicaid Home and Community Based Services: Current and Future Challenges in Rural Communities

Thematic Area: Public Health and Epidemiology

Mentor: Daniel Matlock Mentor Department: Internal Medicine

Abstract:

To gain insight into the delivery of Medicaid's home and community based services (HCBS) program in rural communities, we assessed Colorado's HCBS program via qualitative interviews with key informants within the state legislature, the Colorado Department of Health Care Policy and Financing, directors of rural single entry point (SEP) agencies and providers of HCBS in rural areas. We found the greatest challenges rural communities face in providing HCBS include poor reimbursement by Medicaid resulting in limited workforce, bureaucratic hurdles, and geographical challenges in rural areas. However, rural communities provide many in-kind services to accommodate limited resources. Because HCBS programs reduce Medicaid expenditures for long-term care, policy makers should place a high priority on addressing the challenges faced by providers to ensure future availability.
ABSTRACTS

Shaddeau, Angela

Project Title: Effect of an Empathy Intervention on Student Performance of Pregnancy Options Counseling

Thematic Area: Humanities, Social Science and Education

Mentor: Kristina Tocce
Mentor Department: OB/GYN

Abstract:

Pending at this time
Project Title: Student Professionalism Teaching at the University of Colorado SOM: Towards a New Model of Teaching and Engagement

Thematic Area: Humanities, Social Science and Education

Mentor: Wendy Madigosky  Mentor Department: Family Medicine, Medical School Administration

Abstract:

Medical student professionalism education has been an area of significant research and academic interest, particularly as related to curriculum implementation. Our experience mirrors that of curricular changes in medical education as a whole: the shift towards small-group, case-based curricula can improve student engagement and satisfaction.

We present response data to our student-driven, small-group professionalism teaching, the content of which has been continuously re-worked and improved based on ongoing student feedback. The session is integrated into our ongoing longitudinal curricular thread, encompassing humanities, ethics and professionalism. First and second-year students were surveyed immediately after professionalism teaching, which featured our reworked, case-based discussions. The students shared their opinions on case realism, relationship of cases to medical school experiences, and other professionalism tools that would be useful. The data were then compiled and analyzed for significant differences or repeated themes in written responses.

We demonstrate high levels of student satisfaction and perceived realism of the cases, using the newly implemented curriculum. The survey data that we analyzed showed that a majority of responding students felt positively about the session (89.5% of second-years, 63.6% of first-years). 87.2% of first-year respondents felt the cases were realistic, as did 93.2% of second-year students. Comparing the 2011 data, the average (mean-adjusted) Likert score for general student satisfaction was 4.0. This years data had no score lower than 4.15, demonstrating increased engagement. Interestingly, there was a statistically significant difference between this years two data sets in responses to the prompt “the cases were relevant to my medical school experience thus far”, with the second-year respondents answering the question more positively. This could be interpreted as an additional year of medical school lending more realism to cases that may originally seem far-fetched.
Eventually our desire is to disperse the curriculum and associated materials for use by other institutions, leading to greater satisfaction with medical professionalism education on a larger scale. Our vision includes publication of our materials and data in a peer-reviewed curricular repository, as well as posting the content on our own internal website as reference. Perhaps our greatest distinction is that our curriculum is entirely student-driven: the cases are student-written and edited, and in many small groups, the discussion is led by senior students. As medical education demand increases, and more students are absorbed into classes, we anticipate that the teaching of, and engagement in, medical professionalism will only continue to grow in importance.
Project Title: Appropriately Compensating Community Health Workers in the Napo River Region of Peru

Thematic Area: Global Health

Mentor: Jennifer Bellows
Mentor Department: Emergency medicine

Abstract:
ABSTRACTS

Smits, David

Project Title: A theoretical study of ocular biomechanics and anterior chamber anatomy

Thematic Area: Basic Science

Mentor: Malik Kahook
Mentor Department: Ophthalmology

Abstract:

The purpose of this study is to characterize the influence of ocular biomechanics on the angle between the scleral spur and the outer wall of schlemms canal (SS-OWSC) using finite element analysis (FEA). Using ANSYS engineering software (ANSYS, Inc. Canonsburg, PA USA), a parametric FEA study was conducted assessing the effect of ocular tissue elastic modulus, intraocular pressure (IOP), and ciliary body force on the conventional aqueous humor outflow pathway. The SS-OWSC angle decreased by 32% as eye pressure increased from 15 to 30 mm Hg. Elastic modulus parameterization of the scleral spur and limbal structures had the greatest effect of all eye tissue components on SS-OWSC angle. Increasing modulus of the scleral spur limited reduction in angle when IOP was increased. Decreasing modulus of the cornea and sclera had less of an effect on limiting angle reduction compared to stiffening limbal structures. Maximum ciliary body contraction force determined in our model (188.75 µN) was not great enough to fully compensate for SS-OWSC angle collapse at higher IOP. Elastic modulus and IOP may play an important role in affecting aqueous humor outflow in the limbus. Altering modulus of eye tissues marks a potential therapeutic option for primary open-angle glaucoma.
ABSTRACTS

Taylor, Evan

Project Title: Healthcare Seekers and Healthcare Providers' Expectations in Southwest Uganda

Thematic Area: Global Health

Mentor: dave hibbard       Mentor Department: n/a

Abstract:
ABSTRACTS

Ulmer, Susan

Project Title: Improving rates of vitamin D supplementation in East African immigrant infants

Thematic Area: Public Health and Epidemiology

Mentor: Jeffrey Cook

Mentor Department: Family Medicine

Abstract:

There has been a resurgence of vitamin D deficiency rickets over the past few decades despite efforts to increase awareness as well as new recommendations regarding supplementation. Of those at risk, it has been found that African American breast-fed infants, particularly those whose mothers wear concealing clothing (veils) are at the highest risk. This study, Improving rates of vitamin D supplementation in East African immigrant infants, aims to assess whether a culturally-appropriate educational intervention can increase the rate of vitamin D supplementation in an East African population of patients who attend the Salud Family Health Center in Fort Morgan, Colorado. The study will take place through the administration of a survey to determine baseline vitamin D supplementation, followed by enrollment of East African infants into the study. Those in the intervention arm will be provided with culturally-appropriate research materials as well as vitamin D supplementation. A survey will then be administered to assess adherence to vitamin D supplementation recommendations. Our goal for enrollment is 20 controls and 20 intervention subjects. At this time, we are still collecting baseline data and have received a total of thirteen completed baseline surveys. Enrollment has progressed at a slower pace than expected but efforts are in place to improve rates and progress the study.
ABSTRACTS

Veazey, Kathryn

Project Title: 4th Year Family Planning Electives: Students' Motivations, Perceptions, and the Impact on Future Practice

Thematic Area: Humanities, Social Science and Education

Mentor: Kristina Tocce  Mentor Department: Ob-Gyn

Abstract:

Family Planning Electives: Students Motivations, Perceptions and the Impact on Future Practice

Study objective: This qualitative study explored 4th year medical students motivation to enroll in Family Planning (FP) electives and the resulting perceptions/changes in beliefs after rotation completion. Investigating competency assessment and the impact of FP rotations on future plans for abortion provision were secondary objectives.

Methods: Through the Visiting Student Application Service and the Family Planning Fellowship National Office, 37 LCME-accredited U.S. medical schools were identified as offering 4th year FP electives. We requested that all course directors recruit study participants between June 2012 and June 2013; 21 directors invited their students to contact us for study enrollment. A research assistant then administered a 45-minute semi-structured phone interview and a 6 question demographic survey. Each interview was transcribed, coded for themes and analyzed using ATLAS/ti.

Results: Twenty-nine students were interviewed, representing thirteen institutions. Five key themes emerged. First, exposure to contraception and options counseling were the predominate motivations to pursue FP training during the 4th year. Although approximately half of the students wanted to gain knowledge of abortion procedures, few specifically sought an experience providing abortions. Second, personal beliefs regarding abortion did not typically change after the elective. However, many interviews revealed emotional difficulty with observing late second trimester procedures. Other sensitive issues centered around contraception, including the lack of uptake after abortion and restricted access to highly effective methods based on insurance status. Third, self-assessments indicated competency with contraception and options counseling, but the need to do more terminations to reach procedural competency. Only 2 students were officially evaluated for clinical skill. Fourth, even after completion of a FP rotation, students continued to remain unsure if abortion provision will be a part of future careers. The majority desired to continue training during residency, but anticipated that systematic and facility-related barriers would limit their ability to perform
abortions after completion of residency training. Finally, students unanimously recommended FP electives to their colleagues due to the depth of patient experiences and the opportunity to learn hands-on procedural skills.

Conclusions: Although FP electives offer the opportunity for abortion provision, most students pursue these electives to gain additional counseling experience. Faced with emotionally challenging situations, students’ beliefs regarding abortion and contraception are typically solidified. Awareness of these themes when designing FP curriculums will help fulfill students expectations and meet their psychosocial needs.

Abortion, contraception counseling and options counseling were identified as gaps in current medical school curriculums. FP electives not only fill these gaps, but they also have the potential to be utilized for the direct assessment of clinical competence.
Project Title: Safety of transcranial magnetic stimulation: A review of the literature

Thematic Area: Clinical Science

Mentor: Benzi Kluger
Mentor Department: Neurology

Abstract:

Transcranial magnetic stimulation (TMS) has been used in both physiological studies and, Disease (PD). Prior TMS studies in healthy subjects and other patient populations demonstrate a slight risk of seizures and other adverse events. Our goal was to estimate these risks and document other safety concerns specific to PD patients.

Methods:

We performed an English-Language literature search through PubMed to review all TMS studies involving PD patients. We documented any seizures or other adverse events associated with these studies. Crude risks were calculated per subject and per session of TMS.

Results:

We identified 84 single pulse (spTMS) and/or paired-pulse (ppTMS) TMS studies involving 1091 patients and 77 repetitive TMS (rTMS) studies involving 1137 patients. Risk of adverse events was low in all protocols. spTMS and ppTMS risk per patient for any adverse event was 0.0018 (95% CI: 0.0002 - 0.0066) per patient and no seizures were encountered. Risk of an adverse event from rTMS was 0.040 (95% CI: 0.029 - 0.053) per patient and no seizures were reported. Other adverse events included transient headaches, scalp pain, tinnitus, nausea, increase in pre-existing pain, and muscle jerks. Transient worsening of Parkinsonian symptoms was noted in one study involving rTMS of the supplementary motor area (SMA).

Conclusion:

We conclude that current TMS and rTMS protocols do not pose significant risks to PD patients. We would recommend that TMS users in this population follow the most recent safety guidelines but do not warrant additional precautions.
Project Title: Defining the Candidate for Surveillance or Targeted Focal Therapy in Prostate Cancer

Thematic Area: Clinical Science

Mentor: E. David Crawford
Mentor Department: Surgery, Division of Urology

Abstract:

The burden of prostate cancer remains high, and it is the most common cancer treated by urologists. Many men are diagnosed with low risk, clinically insignificant prostate cancer. However, no adequate clinical diagnostic criteria currently exist to accurately risk stratify patients, or identify which tumors will progress to life-threatening cancer. Further compounding this problem, current transrectal ultrasound (TRUS)-guided biopsy technique has poor sensitivity. Thus, defining which patients should undergo definitive therapy, and which should undergo active monitoring is difficult and influenced by inadequate data. Three-dimensional mapping biopsy (3DM) is an emerging technique that gives the physician a model of the prostate with precise locations of malignancy. This allows for more accurate risk stratification of patients. Additionally, it allows for the use of targeted focal therapy (TFT). This is a technology that utilizes 3DM to identify focal cancerous lesions and then subsequently treats them, sparing benign tissue and the decreasing the need for more morbid, larger procedures. Imaging techniques are currently inadequate for the identification of prostate cancer. However, advances in magnetic resonance imaging (MRI) and positron emission tomography (PET) are promising and will hopefully be able to identify focal cancers non-invasively, further improving the technique of focal targeted therapy.
ABSTRACTS

Wills, Stephen

Project Title: See form submitted by Taisa Priester for final title

Thematic Area: Humanities, Social Science and Education

Mentor: Mark Deutchman  Mentor Department: Family Medicine

Abstract:

BACKGROUND AND OBJECTIVES:

Our country has a primary care shortage, and the medical field faces the difficult task of producing physicians dedicated to generalist medicine. Medical Schools have for years overestimated the percentage of graduates entering primary care. We aim to clarify the discrepancy between the percentage of graduates deemed as "primary care" doctors and those that actually enter careers in primary care from the University of Colorado School of Medicine (CUSOM). We then suggest changes that CUSOM could implement to increase the number of graduating students eventually entering careers in primary care. We hope that this institution as well as others will take this data to realize this discrepancy and use it to motivate change.

METHODS:

Residency match data from the CUSOM 2003-2009 was used to classify graduates as "nominally primary care" or "non-primary care" based on their residency upon graduation from medical school. We defined nominal primary care as those who matched in Family Medicine (FM), Internal Medicine (IM), IM-Primary, Pediatrics and Med-Peds. We located all CUSOM nominally primary care graduates at their current practice location to determine whether their actual career was in primary care. In our research, we compare the nominal and actual primary care graduates, and examine this data broken down by specialty.

RESULTS:

During the study period of 2003-2009, while 47.7% of graduates nominally entered primary care, only 18.7% CUSOM graduates eventually practiced primary care.

CONCLUSIONS:
The number of graduates from the University of Colorado School of Medicine that eventually enter careers in primary care is significantly lower than would be expected based on the reported numbers at graduation.
ABSTRACTS

Wohletz, Bethany

Project Title: Outcomes of Obese Patients Following Admission for Trauma Related Injuries

Thematic Area: Clinical Science

Mentor: Kelly Bookman
Mentor Department: Emergency

Abstract:

Objective: Previous studies have demonstrated a correlation between obesity and increased mortality and morbidity following trauma. The purpose of this study is to understand the impact of obesity on the outcomes of trauma patients with injuries requiring hospitalization.

Method: A retrospective review of the electronic medical records at the University of Colorado Hospital, a level two trauma center, for patients admitted from the emergency department for traumatic injuries sustained between January 11, 2013 and December 27, 2013. Patients were stratified into four groups on the basis of weight: below average weight (BAW), average weight (AvW) and above average weight (AAW) and very above average weights (VAW). Study outcomes included length of stay (LOS) and death as proxy for number of complications.

Results: For the time period reviewed, a total of 295 patients were seen in the emergency department for trauma activations or alerts. Of those, only 87 patients met our inclusion and exclusion criteria. Our study found that AvW patients had the lowest LOS of 6.80 days while all other groups had greater LOS with the AAW group having the greatest LOS of 19.03 days. Though there were a greater number of deaths in both the AvW and VAW groups, we are unable to say that these results are significant.

Conclusion: Using LOS and mortality as end-points to approximate number of complications in obese versus non-obese patients, our results are consistent with previous studies suggesting that patients with above average weight and very above average weight are at a greater risk for complications following trauma.
ABSTRACTS

Arango, Natalia

Project Title: Immediate Postpartum LARC in Adolescents: Implants vs IUDs

Thematic Area: Clinical Science

Mentor: Kristina Tocce     Mentor Department: OB/GYN

Abstract:

Though the rate of teen pregnancy has decreased over the last few decades, repeat pregnancies make up 20% of births to adolescent mothers. Prevention of rapid repeat pregnancy has become a priority in this country. The objective of this study was to determine continuation and repeat pregnancy rates in adolescents who received immediate postpartum subdermal contraception before hospital discharge to those who received immediate post-placental IUD insertion. Implant continuation at 6 months was 97% compared to 71% continuation rate of post-placental IUD. At 12 months, continuation rates were 86% and 61%, respectively for implant vs. post-placental IUDs. Repeat pregnancy rates were higher in the postplacental IUD group at 12 months, 7.6%, compared to 1.5% in the implant group. Immediate postpartum implant placement in adolescents has excellent continuation rates at 12 months after delivery, and rapid repeat pregnancy is significantly decreased when compared to immediate postplacental IUDs.
Project Title: Non-Therapeutic Neonatal Circumcision: a comparison of position statements from across the globe.

Thematic Area: Humanities, Social Science and Education

Mentor: Robin Michaels                  Mentor Department: Cell & Developmental Biology

Abstract:

It is estimated that one in three men in the world is circumcised; yet circumcision rates in the developed world are widely divergent. Canada, the United Kingdom, Australia, the Netherlands and the United States have all produced position statements regarding non-therapeutic circumcision of male minors. Of these, the American Academy of Pediatrics (AAP) and the Royal Dutch Medical Association (KNMG) are most polar with respect to opinions regarding the permissibility of infant male circumcision. This mirrors their respective histories with the surgery--where the United States has interfaced with medicalized infant circumcision for over one hundred years and the Netherlands lacks any such history. In this investigation, the the position statements from the AAP and KNMG were analyzed for arguments regarding child's rights vs. parent's rights and risk/benefit/complication discussion. It is realized that the AAP strongly supports the right of parents to make a decision about circumcision for infant males while the KNMG actively discourages non-therapeutic circumcision on the basis of a child's right to autonomy and bodily integrity. Further, the AAP recently became the first medical organization in the world to state that the benefits of neonatal circumcision outweigh the risks while the Dutch (and other European medical leaders who responded to the 2012 AAP statement) argue that a potential prophylactic procedure without therapeutic value must be held to stricter requirements. As such, there is a stark contrast between the AAP's and KNMG's analysis of acceptable risk/complications--with the AAP finding the profile and rate of complications acceptable and the KNMG determining that this risk is impermissible for a non-therapeutic procedure.
ABSTRACTS

Banerjee, Monisha

Project Title: Acute Appendicitis: A disease severity score for the acute care surgeon

Thematic Area: Clinical Science

Mentor: Ernest E. Moore

Mentor Department: Surgery

Abstract:

BACKGROUND: Analogous to organ injury scales developed for trauma, a scoring system is needed for acute care surgery. The purpose of this study was to develop a disease severity score (DSS) for acute appendicitis, the most common surgical emergency.

METHODS: A panel of acute care surgery experts reviewed the literature and developed a DSS for acute appendicitis as follows: grade 1, inflamed; Grade 2, gangrenous; Grade 3, perforated with localized free fluid; Grade 4, perforated with a regional abscess; and Grade 5, perforated with diffuse peritonitis. We applied the DSS to 1,000 consecutive patients undergoing appendectomy from 1999 to 2009 and examined its association with outcomes (mortality, length of hospital stay, incidence of in-hospital, and postdischarge complications). Of the 1,000 patients, 82 were excluded owing to negative or interval appendectomy or advanced end-stage renal disease.

RESULTS: Among 918 eligible patients, the DSS distribution was Grade 1 at 62.4%, Grade 2 at 13.0%, Grade 3 at 18.7%, Grade 4 at 4.4%, and Grade 5 at 1.5%. Statistical analyses indicated a stepwise risk increase in adverse outcomes with higher DSS grades (c-statistics Q 0.75 for all outcomes). Covariates (age, sex, and type of surgical access) did not add to the predictive power of DSS.

CONCLUSION: Based on this single-institution study, the proposed appendicitis DSS seems to be a useful tool. This DSS can inform future, national efforts, which can build on the knowledge provided by the present investigation. This DSS may be useful for comparing therapeutic modalities, planning resource use, improving programs, and adjusting reimbursement.
ABSTRACTS

Berry, Andrew

Project Title: Liver X Receptor Isotypes Exert Opposing Control over Skeletal Homeostasis as Demonstrated by Gain-and Loss-of-Function Studies.

Thematic Area: Basic Science

Mentor: Karen King

Mentor Department: Department of Orthopaedics

Abstract:

The liver X receptor (LXR) is a nuclear receptor that functions in oxysterol metabolism in liver and other tissues including bone. Thus, we investigated the potential for LXR activation to benefit bone health using gain- and loss-of-function experiments. Mice were generated deficient in either or both LXR isotypes and compared to wild type to investigate loss-of-function. In another experiment, wild type mice were fed chow containing DMHCA (an LXR agonist) for two weeks to investigate gain-of-function. To investigate gain-of-function at a cellular level, an osteoblast cell line was treated in vitro with DMHCA over 14 days. We found large, significant decreases in gene expression of LXRβ in both βKO and α/βKO mice, but no difference in LXRα expression in αKO or α/βKO mice. Bone-related targets were increased in αKO bone but were decreased or without change in βKO and α/βKO bone. DMHCA treatment of mice resulted in small, insignificant decreases in expression of bone genes. However, in cultured osteoblasts, DMHCA treatment increased ABCA1 and ABCG1 at days 7 and 14, and OCN at day 7. The results indicate the two LXR isotypes have complex roles in bone. Systemic inactivation of LXRα stimulates bone genes. Because bone has relatively low levels of LXRα, the negative effects of LXRα are due to activation in other tissues where LXRα predominates. DMHCA treatment of osteoblasts in vitro suggests local activation of LXRβ is beneficial to bone. Thus, LXR signaling has differential effects on bone health when activated systemically versus locally and is achieved by isotype specific activation. In conclusion, specific activation of LXRβ, or LXR locally at sites of pathology may be a tool for improving bone health.
Project Title: The Ill Medical Student: Expanding on Current Models of Understanding Illness Narratives and a Feminist Critique of the Themes of Struggle in Medical Student Writings

Thematic Area: Humanities, Social Science and Education

Mentor: Therese Jones
Mentor Department: Center for Bioethics and Humanities

Abstract:

Illness narratives, or pathographies, represent an important mode of understanding the experience of sickness. Beyond the dry language of medical pathophysiology, these works describe the changes, realizations, and spiritual as well as physical consequences of being ill. By nature, these works are subjective, though models of understanding illness have sought to highlight commonalities of experience, and in so doing, have brought to the forefront the inter-subjectivity of the experience of being sick. In addition, a second body of literature exists regarding medical training: the struggles, suffering, triumphs, and defeats inherent in learning the practice of medicine. The rigors of medical training are well-known even in popular culture. Widely viewed television programs such as Scrubs and Gray's Anatomy, while differing greatly in approach, with the former a comedy and the latter a drama, share themes of struggle and loss, both in regard to patient care and personal life, and often have coming-of-age themes interwoven, underscoring the formative nature of medical training.

Analyses of the writings of residents and medical students has been carried out using the models by which we understand illness narratives, and models of understanding illness narratives have been applied successfully to many kinds of writings by medical students and residents alike. Specifically, Arthur Frank’s narrative typologies have been applied to many types of narratives, including works on medical ethics, personal struggles, and on patient care and understanding patients’ illnesses. That this can be done raises a concern regarding the ability of this model to uniquely identify illness. Writings of medical students who are also struggling with illness provide a powerful tool for addressing the concern of taxonomic uniqueness. Since two distinct bodies of work exist which have been analyzed via the same model, i.e. illness narratives and medical student narratives, we can take the limited body of literature of medical students who are struggling with illness and determine what distinguishes the “ill” medical student from the “non-ill” medical student. I argue that two criteria: self-identification with illness, and the illness as an "other" entity, describe a complete taxonomy of only illness narratives. The final topic is an examination of the suffering of the ill medical student, and the contributions of the system of medical education to that suffering. Using narrative, I present a critique of how the ill medical student can be marginalized by individuals and forces within medical education. Institutions of power and authority can be criticized in many ways, but the most relevant critique in this case comes from gender theory and feminism. Overtly and covertly, many of the institutions of power in Western culture maintain patriarchal norms, which serve as defining forces that not only support and nourish patriarchy, but marginalize and disenfranchise individuals unable or unwilling to participate in enforced masculinity. Drawing from the work of the sociologist and gender-
theorist R.W. Connell, I examine medical student narratives about personal illness and a representative sample of narratives not about illness, and argue that the rigid archetypes of masculinity maintain a presence within medical education system and contribute to the ultimate suffering of ill and non-ill medical students alike.
**ABSTRACTS**

Breitnauer, Nicholas

**Project Title:** Creation of a Community Health Needs Assessment Model for Colorado Area Health Education Centers

**Thematic Area:** Public Health and Epidemiology

**Mentor:** Mark Deutchman  
**Mentor Department:** Family Medicine

**Abstract:**

Context: Community Health Needs Assessments (CHNA) is an evolving tool allowing healthcare systems/facilities to better align services and outreach programming with community needs. Recent enactment of the Patient Protection and Affordable Care Act (PPACA) mandates all tax-exempt hospitals to complete CHNA every three years. It is anticipated that the standard-of-practice - if not regulations - will be for most federal or tax-exempt healthcare organizations to complete these assessments. The six separate, publicly funded Colorado Area Health Education Centers (AHEC) have undergone CHNA infrequently and with varying methodologies.

Objective: This study set out to critically analyze the evolution of CHNA, with special consideration given to the new PPACA mandates, in hopes of applying a useful and reproducible model for Colorado AHECs.

Methods: Evaluation will take place of a pilot Southwestern Colorado AHEC needs assessment and a recently published University of Colorado Hospital CHNA compliant with PPACA guidelines. Specifically, each will be analyzed through the window of 1) population selection, 2) health statistic and qualitative data, 3) prioritization of needs, 4) strategies for and implementation of interventions, and 5) wide accessibility of report. This data then informed the creation of a reproducible CHNA model - compliant with PPACA guidelines - for the individual Colorado AHECs. Lastly, the proposed model was trialed with a needs assessment of Colorados Centennial AHEC.

Results: Analysis of the two prior CHNA represented two different models of conducting CHNA. The University of Colorado Hospital model reflects a CHNA in compliance with PPACA yet for a specific health institution vs. a regional approach. The Southwestern AHEC model represented an older model of CHNA which reflects expansive data collection with more emphasis on recognizing health disparities and less emphasis on strategies for improving health needs. Consequently, the model created for the six Colorado AHEC models more closely represents compliance with the PPACA guidelines since AHECs are federally funded entities, as well as having greater emphasis on creating
and implementing strategies for improving the health of the AHEC regions people. As such the Colorado AHEC model places emphasis on creating strategies specific to each AHEC region to improve health of the community. After trialing the model with the Centennial region, it appears that this is a workable model that could be reproduced in the other AHEC regions.

Conclusions: CHNA can be extremely valuable tools and are becoming more standardized since the enactment of the PPACA. As such the Colorado AHECs would benefit by regular CHNA that are 1) compliant with PPACA regulations, 2) customizable to each Colorado AHEC region, and 3) take into consideration specific programs currently ongoing in each AHEC.
ABSTRACTS

Brunger, Nicholas

Project Title: A Reflection on Guatemala's malnutrition crisis and the impact of village health workers on improving nutrition in rural Guatemalan communities

Thematic Area: Global Health

Mentor: Sue Hammerton Mentor Department: Medicine

Abstract:

Paso Caballos and Belen are rural and largely indigenous communities located in the northeastern part of Guatemala in a department called the Peten. Similar to these rural communities is the prevalence of obesity, diabetes, and malnutrition. Solely based on observation, it appears that many women were overweight. Given this observation, it is puzzling to witness the number of malnourished and underweight children. Our previous observations of SCOM pairs during our first visit to Guatemala were confirmed by working in a clinic with the San Benito Parish Health Team. Too often in a single visit, overweight women are being treated for diabetes and at the same time seeking treatment for their malnourished, underweight children. We hypothesized that the nutritional habits practiced in many rural Guatemalan communities were not healthy for either women or their children. Examining the factors that contribute to malnutrition and SCOM pairs in Guatemala was the critical first step in defining the project, as was discovering what projects were already in action on site. With these thoughts and personal observations in mind, we directed our energy towards community nutrition education. This fit our desire to create a sustainable and immediately impactful project that would hopefully aid in battling Guatemala’s malnutrition crisis. It was also determined that the education would be of most use if it targeted rural, indigenous communities. The most notable outcome from the experience was recognizing the community health workers as the most integral and important contribution to the project, especially when attempting to create a sustainable project. Placing an existing community member at the center of the project is not unique to this experience and not applicable to only projects aimed at education. It can be universally applied to other areas of Global health work. Doing so has the potential to strengthen other Global health ventures with hopes of leading to greater success and impact. I recognize this as a major outcome of my experience, and with the help of my mentor, created a digital story that addresses the importance of local health workers in community improvement initiatives.
Cho, IL-Gyu

Project Title: A Brief Review of Valproic Acid-Induced Hyperammonemic Encephalopathy

Thematic Area: Clinical Science

Mentor: Allan Prochazka  Mentor Department: Internal Medicine

Abstract:
Project Title: Is Medical Tourism Itinerant Surgery?

Thematic Area: Clinical Science

Mentor: Arlen Meyers
Mentor Department: Otolaryngology, Dentistry and Engineering

Abstract:
ABSTRACTS

Dudevoir, Michelle

Project Title: An analysis of leg length discrepancies in children with spastic hemiplegic cerebral palsy

Thematic Area: Clinical Science

Mentor: Jason Rhodes  Mentor Department: Children's Hospital Orthopaedics

Abstract:

Though leg length discrepancy is well-described in hemiplegic cerebral palsy, the natural history is poorly understood, no prediction algorithms exist currently, and there is no consensus regarding the magnitude of discrepancy that merits surgical intervention. The current study sought to provide insight into LLD in children with spastic hemiplegic CP by gathering various demographic data and leg length discrepancies over time. In addition to characterizing the natural history of LLD in children with spastic hemiplegia, we aimed to identify trends among the population that may help clinicians determine when to treat LLD and to what extent. [Insert results and conclusions when available.]
ABSTRACTS

Eldeiry, Mohamed

Project Title: Mechanical Stress Alters the Inflammatory Response of Valvular Endothelial Cells to TLR4

Thematic Area: Clinical Science

Mentor: Mentor Department:

Abstract:

Calcific aortic stenosis is a chronic inflammatory disease and is correlated with atherosclerosis. Atherosclerotic buildup has a non-random pattern of distribution in the arterial tree favoring regions of decreased overall shear stress due to turbulent flow. The aortic side of the valve experiences low and oscillatory/reciprocating shear while the ventricular side experiences high, pulsatile, and unidirectional shear. Human aortic valve interstitial cells (AVIC) play an important role in the inflammation leading to the osteogenic change. However, little remains known about the role of aortic valve endothelial cells (AVEC) and the role they play in this pathology, the communication with AVICs, and the effects of physiologic shear stress on this transformation. We hypothesize that low oscillatory shear induces an inflammatory response in aortic valve endothelial cells. An experimental protocol was designed to expose AVECs to shear stress and evaluate the expression of inflammatory cytokines and chemokines such as ICAM-1, BMP-2, ALP, TGF-β1, BMP-4, and VCAM-1. Due to unforeseen difficulty with establishing the experimental setup, only preliminary results for the production of ICAM-1 under shear stress were generated.
Project Title: Relationships Between Quality of Life, Self-efficacy, and Medication Adherence in Patients with Type II Diabetes.

Thematic Area: Clinical Science

Mentor: Diane King  Mentor Department: University of Alaska

Abstract:

In the United States, diabetes affects 23.6 million people (7.8% of the population). Traditional management of type two diabetes (DM2) primarily focuses on using pharmacotherapy to achieve glycemic control, which in turn significantly decreases rates of microvascular complications and subsequent morbidity. However, recent studies question the morbidity and mortality benefits of intensive glycemic control and increasingly demonstrate that the management of diabetes is multifactorial. This study attempts to determine relationships between medication adherence, quality of life, and self-efficacy.

Data from surveys completed during the My Path to Healthy Life study were analyzed for associations between medication adherence, quality of life, and self-efficacy. Medication Adherence was correlated with lower A1c, lower diabetes distress, higher quality of life, and higher self-efficacy.

Improved medication adherence, and its subsequent beneficial effects on blood glucose over time, reduce a patient’s burden of disease and is associated with a higher quality of life. Diabetes care management should focus on improving self-efficacy, in addition to medication adherence, as these skills aid patients in developing plans to combat the multifaceted nature of the disease and promote individualized, patient-centered care. More research is needed to solidify the associations between medication adherence, self-efficacy, and quality of life.
ABSTRACTS

Horne, Alexander

Project Title: A survey of patient satisfaction in the surgical ICU

Thematic Area: Clinical Science

Mentor: Jason Brainard  Mentor Department: Anesthesia

Abstract:

Purpose: To create a simple survey that can gauge patient and family satisfaction in the University of Colorado Surgical Intensive Care Unit. Methods: create a 3-question survey with categorical likert score responses to assess satisfaction. Distributed by ICU staff to patients and families before discharge. Results: Due to the relocation of the ICU, all completed surveys were lost and there are no preliminary results at this time. Conclusions: A simple survey can be a valuable tool to help gauge patient satisfaction and guide improvements in the ICU. The next steps will be to restart the distribution of the survey sometime in spring 2014.
Project Title: Neuropsychological outcomes after childhood stroke

Thematic Area: Clinical Science

Mentor: Timothy Bernard  Mentor Department: Pediatrics

Abstract:

Childhood Arterial Ischemic Stroke (AIS) affects 2-6/100,000 children every year in the United States and often has life-long morbidity associated with it. There is a paucity of neuropsychological outcome studies in children with AIS and the few that have been done have primarily looked at general indices of outcome such as IQ or adaptive functioning. Although various factors likely predict neuropsychological outcome (e.g., pre-morbid function, comorbid conditions, and the physical characteristics of the stroke such as size and location), this study also examined arteriopathy as a novel predictor. We collected data on children with childhood AIS (stroke after 28 days of life) seen at Childrens Hospital Colorado from 2005-present. We collected neuropsychological, radiographic, and hematological data on these children.

Overall, children with AIS had neuropsychological deficits relative to norms. Analyses were conducted in order to determine whether there is specificity in terms of cognitive profile relative to size, laterality and location of stroke. In addition, subgroups with and without arteriopathy were compared. We found that children who have strokes have lower IQs, and have difficulty with visual motor and language skills compared to the general population. We also found that there was no clear relationship between the presence or absence of arteriopathy and neuropsychological outcome. In addition, we found that children who on initial imaging had bilateral strokes performed significantly worse than children with only right sided strokes. Potential implications of this study include: the ability to improve outcome prediction for parents whose children have had a stroke, and potential stratification of children into a higher risk group for whom more intensive rehabilitation will be required.
Project Title: Cstahr: community and students together against healthcare racism

Thematic Area: Humanities, Social Science and Education

Mentor: Tillman Farley
Mentor Department: Family Medicine

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. This is one of the papers that we have submitted as a group.
ABSTRACTS

Kasch, Anthony

Project Title: Familial Idiopathic Scoliosis in Males; a Sequencing Analysis of the SFI1 Gene on Chromosome 22q

Thematic Area: Clinical Science

Mentor: Nancy Hadley-Miller
Mentor Department: Orthopedics

Abstract:

Introduction

A Genome wide association study previously demonstrated a significant linkage between the SFI1 gene on Chromosome 22 and familial idiopathic scoliosis specifically in men. Idiopathic scoliosis (IS) has long been considered to be a genetic disorder and though many genetic studies have been done, there is no clear consensus determining causative mutation(s). Given the fact that none of these previous studies have investigated the role of SFI1 in IS, we have chosen to investigate a potential linkage between the two by sequencing the 33 exons and 1 SNP.

Methods

Using NCBI genbank we identified the sequence for SFI1. Separating the gene into its 33 exons and 1 SNP, we used Primer Express to develop unique forward and reverse primers to sequence these regions of interest on SFI1. After primers were developed, we tested them on our own DNA using a touchdown PCR protocol, followed by gel electrophoresis and analysis to determine if our primers amplified the DNA as expected. If it did, we cleaned the product up with ExoSap and sent it to the UCHSC sequencing lab. Once sequenced we verified the sequence for accuracy using the CodonCode Aligner software.

Results

We were able to develop primers for all the regions of interest except the forward primers for exons 5-6, and 15. We had difficulty placing a unique primer on or near poly A and poly T regions that we located close to the beginning of the exons.

Conclusion
SFI1’s link to IS remains unclear. By developing accurate primers for almost all the regions of interest on SFI1 we have set the stage for mutational analysis to be conducted between affected Males and their unaffected family members as controls. SFI1 has interactions with other genes that have been studied with regards to IS, most interestingly ESR1. Our hope is that a mutational analysis can be conducted, which may implicate mutations in SFI1 in the IS process that in turn could lead to better understanding and treatment of the disorder.
Abstract:

The co-occurrence of gliomas and multiple sclerosis (MS) in the same patient is uncommon, but a well-reported phenomenon. Most have been high grade astrocytic tumors that developed after the diagnosis of MS, leading authors to postulate that chronic gliosis in demyelinating plaques might be the underlying substrate for secondary induction of a glial neoplasm. Until recently, however, genetic tools have not been available to test the hypothesis that high grade gliomas might arise from longstanding chronic gliosis, with transformation to low grade glioma, and eventually GBM, i.e., be secondary GBMs. We searched our surgical neuropathology and MS Brain Bank databases over the past 25 years (1987-2011) and identified eight cases of co-occurring MS and glioma. After careful review to guarantee both diagnoses, cases were studied by fluorescence in situ hybridization for genetic markers appropriate to diagnosis, as well as by direct sequencing for IDH1/2 and P53. No unusual genetic features were detected in our cohort; further, the 4 GBMs we did identify did not have clinical features of secondary glioblastomas nor did any of the four manifest IDH-1 immunohistochemical expression or IDH1/2 mutations, as might be expected in secondary GBMs. Conversely, PTEN loss and EGFR expression, features often found in primary GBMs, but seldom identified in secondary GBMs, were found in 3 of 4 GBMs. We conclude that gliomas in MS patients have genetic features paralleling counterparts in non-MS patients. There is no strong genetic evidence for GBMs to be secondary GBMs.
King, Lauren

**Project Title:** Growing Years: A needs assessment of low-income single parents at the Warren Village transitional housing community

**Thematic Area:** Humanities, Social Science and Education

**Mentor:** Lindsey Lane  
**Mentor Department:** Pediatrics

**Abstract:**
Project Title: Essure and Immunosuppression

Thematic Area: Clinical Science

Mentor: Kristina Tocce  Mentor Department: Obstetrics and Gynecology

Abstract:
ABSTRACTS

Langager, Jason

Project Title: Smartphone and Tablet Use Among Medical Students

Thematic Area: Humanities, Social Science and Education

Mentor: Mark Deutchman

Mentor Department: Family Medicine

Abstract:
Project Title: Medicaid parity or primary care incentives: Colorados experience with increased primary care payments in 2013

Thematic Area: Public Health and Epidemiology

Mentor: Judy Zerzan Mentor Department: Medicine

Abstract:

Background: The Medicaid primary care payment increase included in the Patient Protection and Affordable Care Act (ACA) offers the opportunity for states to bolster both the supply of primary care providers and help transform the way that care is delivered. More than 160,000 Colorado residents are expected to gain access to health care coverage through the Medicaid expansion. One of, if not the, major goal of the so-called primary care payment bump is to increase physician participation in Medicaid to meet the demands of program expansion.

Methods: Using data provided by the Colorado Department of Health Care Policy and Financing, I used a random sample of 351 providers who attested with the state in order to receive the payment bump. I ascertained their specialties through internet searches and telephone queries of their staff. I used the payment amounts for the first three quarters of 2013 in my analysis. I also conducted a brief survey of these providers by telephone, internet, and fax.

Results: The majority of both providers and spending were in primary care; of the 332 providers, 65 percent (215) could be identified as primary care providers. Of the 312 providers who could be contacted, 88 responded (28%) to the survey. Ten percent stated that they had increased the number of Medicaid clients in their practice as a result of increased payments; and 29 percent stated the increased payments had made a difference in their practice. Primary care and specialty providers did not demonstrate any statistically significant difference in the number of Medicaid patients accepted, changes in practice, or perception of the Medicaid program. However, there was an overall trend towards increased satisfaction with higher payments and resulting changes in provider practice.

Conclusion: The increased payments for primary care services show promise for expanding access for Medicaid clients and improving provider satisfaction, however, the policy might be more effective if it reflected the intent to either promote primary care or support Medicaid parity for all providers. Additionally, the uncertain future of the payment increase may deter providers from incorporating it, and additional Medicaid clients, into their practices.
Project Title: Does ox-LDL regulate osteogenic change of human aortic valve interstitial cells in aortic stenosis

Thematic Area: Basic Science

Mentor: David Fullerton  Mentor Department: surgery

Abstract:

Aortic stenosis from age related degenerative calcific change is the third most common cardiovascular disease and the most common pathology leading to aortic valve replacement. It is estimated that nearly 3% of those 75-86 years of age develop critical aortic stenosis, and among those 85-86 years of age, this incidence is as high as 6%. Despite the widespread prevalence and significant healthcare costs, the basic mechanism that drives this pathological change remain unknown.

There has been an active investigation into this nature of this transformation, yet the molecular pathogenesis that leads to calcification of diseased aortic valve cells remains elusive. Up-regulation of inflammatory pathways and dystrophic osteogenic change of the aortic valve interstitial cells have been implicated in this disease process, though the relationship between these factors and the initiating event driving osteogenic change remain evasive.

Aortic stenosis is a non-reversible, progressive disease with poor survival after diagnosis. Elucidation of the molecular pathogenesis of the disease may allow for medical therapies and/or prevention. Therefore, in effort to elucidate the molecular pathogenesis of the disease, we have considered the relationship between osteogenic change and inflammation as an important topic for exploration. Within this context, there is evidence that inflammatory mediators such as ox-LDL may drive osteogenic change in aortic valve interstitial cells. It has been shown that the osteogenesis of explanted diseased cells have increased concentrations of calcium and potassium along with elevated levels of the potassium transporter PiT-1, which is normally found in osteoblasts, but not in aortic cells. Therefore, we have hypothesized that stimulation of HAVICs with Ox-LDL will induce an osteogenic change evidenced by increased levels of intracellular PiT-1.
Project Title: White matter integrity is altered in Bulimia and Anorexia nervosa

Thematic Area: Clinical Science

Mentor: Guido Frank  Mentor Department: Psychiatry

Abstract:

This study investigated brain white matter (WM) functionality in bulimia nervosa (BN) in order to better characterize brain function in this disorder.

Twenty-one control women (CW, mean age 27 ±7 years) and 19 women with BN (mean age 25 ±5 years) underwent diffusion tensor imaging (DTI) of the brain to calculate fractional anisotropy (FA; giving an indication of WM axon integrity) and the apparent diffusion coefficient (ADC; reflecting WM cell damage).

Insula and fornix FA were significantly reduced in BN and FA values in those regions were negatively correlated with state and trait anxiety in CW but not BN. ADC values were increased in BN in the fornix, frontal WM regions, and the superior longitudinal fasciculus. BN ADC values were positively related to bulimia symptoms and adverse childhood events.

WM integrity is disturbed in BN, and fornix and insula WM axon abnormalities are particularly implicated in BN, as previously reported in anorexia nervosa. Bulimic behavior and adverse childhood life events seem to be directly related to WM cell break down in BN.
ABSTRACTS

Millard, Caren

Project Title: Successful Faculty-Medical Student Mentoring Relationships: Perspectives from Outstanding Mentors

Thematic Area: Humanities, Social Science and Education

Mentor: Stephen Wolf  Mentor Department: Emergency Medicine

Abstract:

Background: The mentoring relationship is valuable to learners and faculty in medical education. Existing literature based only on the perspective of the student or self-identified mentors identifies the benefits and specific roles of the faculty mentor or student mentee. The perspective of student-identified outstanding mentors is limited in the literature.

Objectives: We aimed to identify unique aspects of successful mentoring relationships between faculty and medical students from the perspectives of student-identified outstanding faculty mentors.

Methods: Fourth-year medical students were asked to identify outstanding faculty mentors on a questionnaire at the end of their fourth year. Mentors with repeat nominations over successive years were invited to participate in a one-hour, semi-structured, individual interview about their mentoring relationships with students. All interviews were recorded, transcribed, and manually coded. Using an iterative process with qualitative analysis, emergent themes were identified. Exempt IRB status was obtained.

Preliminary Results: 283 of 295 (96%) graduating medical students from the classes of 2011 and 2012 at the University of Colorado School of Medicine identified 137 outstanding mentors. Of these, 16 (16/137; 12%) were identified in successive years and invited to participate. Fourteen (14/16; 88%) outstanding mentors were interviewed. Preliminary iterative qualitative analysis identified three higher-order emergent themes related to successful mentoring relationships. These included: 1) structural elements (e.g., the faculty’s visibility/exposure to students before a relationship is established, and the students role in managing/owning the relationship), 2) emotional investment (e.g., the faculty and students willingness to be open and vulnerable in the relationship), and 3) relationship awareness (e.g., creating a student-centric relationship where the faculty understands the students need, and both the faculty and the student have awareness regarding the limits of the relationship).
Discussion: The emergent themes revealed novel aspects of successful mentoring as it pertains to relationships between faculty and medical students. The addition of these findings to the literature can be applied within medical education to enhance training of faculty mentors and student mentees, and to improve the quality of mentoring relationships between students and faculty.
ABSTRACTS

Project Title: Obstetric Anesthesia Workforce Survey: Thirty-Year Update

Thematic Area: Public Health and Epidemiology

Mentor: Andrea Fuller  Mentor Department: Anesthesiology

Abstract:

Background: Surveys investigating the obstetrical anesthesia workforce were conducted in 1981, 1992 and 2001 to characterize and understand obstetrical anesthesia practice. The thirty-year update of this survey was conducted in 2012. Anesthesia providers from hospitals in the United States were surveyed to identify the number and types of providers, services, and methods used to provide obstetric anesthesia.

Methods: Using the American Hospital Association Annual Survey of Hospitals, a randomized stratified sample of hospitals was generated based on number of births per year and U.S. census region. Strata were defined as: Stratum I 1,500 births, Stratum II 500-1,499 births, Stratum III & I; 500 births. A total of 341 Stratum I, 440 Stratum II, and 415 Stratum III hospitals were identified. Phone calls were placed to each hospital to obtain contact information for the anesthesia group providing obstetrical services. Providers were personally contacted via phone by a physician to obtain email contact information. Electronic questionnaires (Survey Monkey) were sent via email.

Results: 1201 total hospitals were identified in the random sample and 3% no longer had an OB department. Of the hospitals and providers contacted, 66.8% provided accurate contact information and 18.5% declined to participate. The response rate was 42% from those who provided contact information and 29.4% overall. Administration of regional labor analgesia has increased compared to 2001 across all strata and is available 24 hours per day at 100% of Strata I hospitals. In-house coverage of labor analgesia has increased across all strata, with 97% of Strata I providers in-house. PCEA use in Strata I hospitals was 35% in 2001 and is now approximately 84%. Independent nurse anesthetists providing obstetrical anesthesia services has increased across all strata and was reported at 10% (Strata I), 18% (Strata II) and 68% (Strata III). While 93% of Strata I hospitals allow postpartum tubal ligations, 20% state that inadequate staffing interferes with provision of anesthesia for these cases either always or at off-hours.

Conclusion: In the 10 years since the last survey, there have been some significant changes in how hospitals provide obstetric anesthesia, especially with the use of independent CRNA coverage in smaller hospitals. Additionally, the ubiquitous use of technology has changed survey techniques since 2001, with email being the primary method for data collection. Obstetric anesthesia surveys continue to provide
useful information about the practice of obstetric anesthesia.
Project Title: IL-33 in Cisplatin induced acute kidney injury

Thematic Area: Basic Science

Mentor: Charles Edelstein
Mentor Department: Renal and Hypertension Disease

Abstract:

Inflammation contributes to the pathogenesis of acute kidney injury (AKI). IL-33 is a proinflammatory cytokine, but its role in AKI is unknown. Here we observed increased protein expression of full-length IL-33 in the kidney following induction of AKI with cisplatin. To determine whether IL-33 promotes injury, we administered soluble ST2 (sST2), a fusion protein that neutralizes IL-33 activity by acting as a decoy receptor. Compared with cisplatin-induced AKI in untreated mice, mice treated with sST2 had fewer CD4 T cells infiltrate the kidney, lower serum creatinine, and reduced acute tubular necrosis (ATN) and apoptosis. In contrast, administration of recombinant IL-33 (rIL-33) exacerbated cisplatin-induced AKI, measured by an increase in CD4 T cell infiltration, serum creatinine, ATN, and apoptosis; this did not occur in CD4-deficient mice, suggesting that CD4 T cells mediate the injurious effect of IL-33. Wildtype mice that received cisplatin and rIL-33 also had higher levels of the proinflammatory chemokine CXCL1, which CD T cells produce, in the kidney compared with CD4-deficient mice. Mice deficient in the CXCL1 receptor also had lower serum creatinine, ATN, and apoptosis than wildtype mice following cisplatin-induced AKI. Taken together, IL-33 promotes AKI through CD4 T cell-mediated production of CXCL1. These data suggest that inhibiting IL-33 or CXCL1 may have therapeutic potential in AKI.
Project Title: The Survivor Storytelling Project

Thematic Area: Clinical Science

Mentor: Therese Jones
Mentor Department: Center for Bioethics and Humanities

Abstract:

Background: Ovarian cancer is often referred to as "the silent killer" because it is one of the most under-diagnosed and lethal forms of cancer in women. In 2010, the Centers for Disease Control acknowledged a lack of public awareness related to ovarian cancer, and called for more direct educational efforts for patients, the general public and healthcare providers alike. In early 2011, the Survival Storytelling Project (SSP) was conceptualized as a response to the CDC’s call for increased educational efforts, and is one step on the road to improved survival for ovarian cancer patients in Colorado. The Colorado Ovarian Cancer Alliance (COCA) is one of the largest advocacy organizations for ovarian cancer patients in Colorado. By interviewing more than 20 members of COCA, the SSP reveals the priorities and perspectives of ovarian cancer survivors, and as such, captures the voice of an under-represented community in Colorado.

Methods: The SSP has two phases. Phase 1 is a documentary film divided into short segments and posted on the COCA website. The film serves as an educational tool for ovarian cancer patients and survivors, and allows the survivors themselves to teach the general public about their disease. Phase 1 addresses the CDC’s call for improved education for patients and the general public. Phase 2 is a qualitative analysis of the interview data, which aggregates individual stories into quantifiable information that can be used to educate healthcare providers about patient perspectives and preferences on illness, treatment, and quality of life. To date, basic-science information has not been well matched with an understanding of the priorities of women with ovarian cancer. The purpose of Phase 2 is to align patient and provider perspectives in order to improve care for ovarian cancer patients in Colorado. A four-level coding scheme was used to analyze the comprehensive dataset that was extracted from the interviews. The strategy was adopted from previous studies of qualitative health information. Two independent coders analyzed the data for thematic content, and the data was assessed for inter-coder reliability.

Results: Twenty-four women participated in the study (mean age 56.1 years). Two thirds of the participants were first diagnosed at FIGO Stage III or IV ovarian cancer (N=16; 67%) After reviewing and coding the twenty-four 1-hour interviews there were 557 discrete ideas expressed by the participants. The 557 statements were divided into five major themes, represented by Level 1 Code: "Symptoms" (N=74; 13.3%), "Physician Behavior" (N=69; 12.4%), "Treatment" (N=175; 31.4%), "Coping Strategies" (N=176; 31.6%), and "Advice for Future Patients" (N=63; 11.3%). Sub-themes in Levels 2-4 were also extracted and coded accordingly.

Conclusions: Phase 1 of the SSP is a film project that captures important lessons and anecdotal insight from ovarian cancer survivors. The video will serve as an educational tool in a number of formats, including online, and as a feature of the COCA website; the film will launch in the Spring of 2014. Phase 2 allows healthcare providers in Colorado to compare their
understanding of ovarian cancer development and survivorship with the views expressed by members of a prominent ovarian cancer advocacy organization in their state. By identifying common themes in patient narratives, the SSP sheds light on patient priorities, and identifies areas of improvement relevant to their care. Phase 2 also challenges healthcare providers to identify the incongruities between their own views, and the patients’ perspectives on illness, treatment and quality of life. By treating patients as the experts in their own illness, the SSP explores an untapped educational resource and facilitates a unique form of patient-provider communication.
Project Title: The protumor N2 cell.

Thematic Area: Basic Science

Abstract:

The entral purpose of the immune system is to combat disease and prolong life. It accomplishes this task by identifying differences between known and unknown, foreign and native. This is cells and proteins provides the defense against harm. To this and cells of the immune system are given great power completely restricted cells and many other lineage. Power to traverse the body, past physiological barriers, and even the power to kill other cells. This last power one of regulation, quite possibly the most crucial of all, hinges on the sales potential for discrimination.
ABSTRACTS

Piatz, Christopher

Project Title: Ethical Considerations in the Healthcare of the Incarcerated Woman: A Case Study and Review of the Literature

Thematic Area: Humanities, Social Science and Education

Mentor: Donald Bross  Mentor Department: Pediatrics

Abstract:

Incarcerated women represent a population at high risk for substance abuse, poverty, sexually transmitted infections, and unplanned pregnancy. With recent increases in the number of women incarcerated, most often for nonviolent crimes, the challenge of providing healthcare to this group is greater than ever. Given the combination of a history of maltreatment of this at-risk group and a general lack of understanding of their unique needs, many misperceptions exist about providing reproductive healthcare to this population. This qualitative research project offers a case study, a review of key informants involved in the case, and a literature review aimed at addressing misperception and misinformation regarding the provision healthcare to women involved with the corrections system.
ABSTRACTS

Pollard, Courtney

Project Title: A comparison of labyrinthine reactivity in migraineurs and nonmigraineurs

Thematic Area: Clinical Science

Mentor: Carol Foster  Mentor Department: Otolaryngology

Abstract:

Migraineurs have been shown to be hypersensitive to sensory stimuli during migraine attacks and outside acute migraine attacks compared to non-migraineurs. Migraineurs are also more likely than non-migraineurs to experience motion sickness and have increased visually enhanced vestibulo-ocular reflex gains. This study investigated whether migraineurs might perceive dizziness more intensely than non-migraineurs by comparing a videonystagmometry (VNG) testing result: labyrinthine reactivity. Subject data was collected from an existing VNG patient database at the University of Colorado Hospital. Patients with a diagnosis of a damaging ear disease, such as Meniere's Disease, were excluded from this study. Subjects who presented with dizziness or a diagnosis of vertigo were split into three age and gender matched groups: a migraineur group who met the International Headache Society's (IHS) criteria (Migraineur; N = 300, females = 234), a group of patients who did not completely meet IHS criteria for the diagnosis of migraine (Migraine-like) and a group of patients who had no symptoms of migraine (Non-Migraineur). Groups were compared using one way analysis of variance (ANOVA) (p<0.001). The Migraineur group overall had higher labyrinthine reactivity values with a mean of 37.97 degrees/second which was statistically significant when compared to both the Migraine-like group, 30.74 degrees/sec (p<0.05) and the Non-Migraineur group, 30.70 degrees/sec (p<0.001). This suggests that migraineurs experience vestibular stimuli more intensely compared to non-migraineurs.
ABSTRACTS

Powers, Matthew

Project Title: A Comparison of Labyrinthine Reactivity Between Migraineurs and Non-Migraineurs.

Thematic Area: Clinical Science

Mentor: Malik Kahook
Mentor Department: Ophthalmology

Abstract:

PURPOSE: To describe the evolution of a novel device for facilitation of continuous curvilinear capsulorhexis (CCC).

SETTING: Department of Ophthalmology, University of Colorado School of Medicine, Aurora, Colorado, USA.

DESIGN: Experimental study.

METHODS: Bench-side ex vivo testing of unique prototypes for guidance and assistance of CCC in bovine and human eyes was conducted. Five designs were sequentially tested: a flexible circular blade constructed of nickel-titanium alloy (nitinol), a flexible nitinol guide wire, a flexible elastomeric suction device, a combination approach of a nitinol guide wire and flexible silicone ring, and a freestanding micropatterned silicone ring.

RESULTS: The first 3 designs were not amenable to insertion through a sub-2.4 mm corneal incision and failed to maintain adequate downward force to cut the capsule and/or prevent radial tears. The fourth design was successfully inserted through a 2.4 mm incision, and maintained adequate downward pressure and contact to guide a manual CCC without radial tears. The final design was insertable through a 2.4 mm incision and exhibited self-adhesive characteristics after placement on the anterior capsule with an ophthalmic viscosurgical device filling the anterior chamber.

CONCLUSIONS: Given the steep learning curve of manual capsulorhexis and the high cost of capsulotomy assistive devices such as femtosecond laser, an alternative approach for creating a CCC is desirable. Performance of a highly precise manual CCC through a small incision using a medical-grade silicone device with a unique adhesive micropatterned design is a viable and cost-effective option for use in cataract surgery across a wide range of user experience.
Project Title: Gastrointestinal Diseases

Thematic Area: Global Health

Mentor: Alan prochazka
Mentor Department: school of medicine, cu

Abstract:

This module introduces the broad impact of gastrointestinal disease on a global scale through categorical categorization of etiologic agents, treatment schema, pertinent public health challenges, and social justice issues that influence GI disease prevalence.
Rodriguez, Marina

**Project Title:** The Efficacy of Capsular Repair in Arthroscopic Femoroacetabular Impingement Surgery

**Thematic Area:** Clinical Science

**Mentor:** Omer Mei-Dan **Mentor Department:** orthopedics

**Abstract:**
Project Title: Scope of Practice and Autonomy of Physician Assistants in Rural versus Urban Emergency Departments

Thematic Area: Public Health and Epidemiology

Mentor: Adit Ginde
Mentor Department: Emergency Medicine

Abstract:

ABSTRACT

Objective: We compared the scope of practice and autonomy of emergency medicine (EM) physician assistants (PAs) practicing in rural versus urban emergency departments (EDs).

Methods: Using the American Academy of Physician Assistants Masterfile, we surveyed a random sample of 200 U.S. EM PAs, with oversampling of an additional 200 rural PAs. We classified location by zip code-based Rural-Urban Commuting Area codes and compared responses about conditions managed, procedures performed, and physician supervision between rural versus urban groups.

Results: We received 237 responses from PAs in 44 U.S. states, of which 201 were valid responses (105 rural, 96 urban) from PAs currently practice in EDs (59.3% exclusion-adjusted response rate). Compared to urban PAs, rural PAs more frequently managed in the past year: cardiac arrest (67% vs 44%); stroke (86% vs 72%); multi-system trauma (83% vs 70%); active labor (44% vs 23%); critically ill child (82% vs 65%) and were more likely to have performed: intubation (65% vs 44%); needle thoracostomy (21% vs 8%); and tube thoracostomy (46% vs 26%). Rural PAs more often reported never having a physician present in the ED (38% vs 0%), and less often reported always having a physician present (50% vs 98%). Rural PAs were also less likely to report that a physician evaluates &gt;75% of their patients (8% vs 18%), and more likely that a physician never evaluates all of their patients (19% vs 7%).

Conclusions: Rural PAs reported a broader scope of practice, more autonomy, and less access to physician supervision than urban PAs.
ABSTRACTS

Schaffer, Lindsey

**Project Title:** Anschutz Medical Campus student community outreach: Steps towards improved community-campus collaboration

**Thematic Area:** Public Health and Epidemiology

**Mentor:** Michele Doucette **Mentor Department:** Family Medicine

**Abstract:**

Overview: Collaborating on health and community issues can benefit all members of the Anschutz Medical Campus (AMC) and surrounding communities. The AMC is a health sciences center recently built in Aurora, CO, an underserved region of the state, which has created opportunity and need for building community-campus relationships. A new AMC Community-Campus Partnership was recently launched to identify and address these connection needs. While the focus of this new initiative has been more from the university administrative level, an important piece of the community-campus connections are the community outreach activities of the many student groups on campus.

**Purpose:** The AMC student groups currently lack inter-group communication and an overarching community-campus connections structure. The purpose of this project was to identify AMC student groups community engagement activities and based on the initial findings, design a process for maintaining a sustainable method of inter-group communication to enhance community-campus connections.

**Methods:** An initial online survey was sent to the leaders of 33 student groups from across campus that were involved in the community. Basic group description and community engagement data were collected along with the leaders attitude toward other groups and collaboration. The following year, contacts were reestablished through the student affairs offices and five in-person interviews were conducted to gather more detailed information on group activities and to begin website planning.

**Results:** The survey and interview results revealed a wide range of student activities in Denver and Aurora with most groups agreeing that they could benefit from collaboration with other students. The interviews also helped to build a framework for collecting group information on a future website.

**Conclusion:** After assessing the current state of AMC student groups and their community engagement, a central online database will help fill the gaps in student group communication and realize the potential benefits of increased collaboration. This new database, the Community-Campus Partnership website, can build upon the many student groups and activities identified during this project and connect both groups within the campus, and the campus with the surrounding community. Plans for the design, function and sustainability are discussed with the goal to improve organization, communication and collaboration. Next steps will include the website development and further group exploration as the Campus-Community Partnership moves forward.
Project Title: Parent attitudes toward childhood immunizations and immunization refusal: a review

Thematic Area: Public Health and Epidemiology

Mentor: Kristin Furfari  Mentor Department: Medicine

Abstract:

Aim To review the current literature surrounding parent attitudes and perceptions of childhood immunizations and the specific attitudes and perceptions which result in immunization refusal.

Methods “A comprehensive literature review of studies discussing parent refusal of vaccinations and the attitudes and perceptions which have led to that decision. Multiple electronic databases were searched to collect the studies related to personal beliefs surrounding vaccine refusal.

Results “Parents have many perceptions about vaccinations which ultimately led to refusing these vaccinations for their children. Parent perceptions include concerns about the immune system, vaccine efficacy and safety, chronic disease, vaccine adverse reactions and not enough access to reliable information.

Conclusion - As the amount of accurate and inaccurate information on vaccinations available to parents continues to rise, and as parent's perceptions about vaccinations and the diseases they protect against continue to change, it is necessary to understand current parental concerns as well as reasons behind vaccination refusal. Furthermore, it is important for family physicians, pediatricians, and other health care providers involved in vaccinating children to understand what sources parents use to educate themselves in order to be fully prepared to have productive conversations with parents and address their individual concerns.
Project Title: A Review of Emergency Medical Services Events in US National Parks From 2007 to 2011

Thematic Area: Public Health and Epidemiology

Mentor: Tracy Cushing
Mentor Department: Emergency Medicine

Abstract:

OBJECTIVE: Outdoor recreation is growing in the United States, with more than 279 million annual visitors to areas controlled by the National Park Service (NPS). Emergency medical needs in these parks are overseen by the National Park's rangers within the NPS Emergency Medical Services (EMS) system. This study examines medical and traumatic emergencies throughout the NPS over a 5-year period to better understand the types of events and fatalities rangers encounter, both regionally and on a national scale. METHODS: This is a retrospective review of the annual EMS reports published by the 7 NPS regions from 2007 to 2011. The following were compared and examined at a regional and national level: medical versus traumatic versus first aid events, cardiac events and outcomes, use of automated external defibrillators, and medical versus traumatic fatalities. RESULTS: The national incidence of EMS events was 45.9 events per 1 million visitors. Medical, traumatic, and first aid events composed 29%, 28%, and 43% of reports, respectively. Of medical episodes, 1.8% were cardiac arrests, of which 64.2% received automated external defibrillator treatment; 29.1% of cardiac arrests survived to hospital discharge. Of fatalities, 61.4% were traumatic in nature and the remaining 38.5% were nontraumatic (medical). Regional differences were found for all variables. CONCLUSIONS: On a national level, the NPS experiences an equal number of medical and traumatic EMS events. This differs from past observed trends that reported a higher incidence of traumatic events than medical events in wilderness settings. Cardiac events and automated external defibrillator usage are relatively infrequent. Traumatic fatalities are more common than medical fatalities in the NPS. Regional variations in events likely reflect differences in terrain, common activities, proximity to urban areas, and access to definitive care between regions. These data can assist the NPS in targeting the regions with the greatest number of incidents and fatalities for prevention, ranger training, and visitor education.
ABSTRACTS

Sepulveda, Carmen

Project Title: Community and Students Together Against Healthcare Racism (C-STAHR) Organizational Development and Research Processes from Years 1-4

Thematic Area: Humanities, Social Science and Education

Mentor: Tillman Farley

Mentor Department: Family Medicine

Abstract:

CHAPTER FOUR: C-STAHR Video Project

Introduction

C-STAHR is an organization that encompasses individuals from all walks of life. There are health professional students, faculty from the School of Medicine and School of Public Health, and the community members. As students we have noticed that our group has a rich source of stories and experiences. From the very beginning of the formation of C-STAHR, it was clear that the community members in our CAN have life experiences related to healthcare, racism, personal health, and their work with the community that they wish to share. These stories are valuable in understanding their participation in C-STAHR. After some brainstorming and research, we realized that it would be incredibly beneficial, educational, and therapeutic to capture those stories and experiences and share them through digital media. Within the environment of health disparities and discriminatory practices live incredible and inspiring community leaders. All of these leaders have stories related to navigating a health system whose environment, physicians (and other health professionals), and culture created barriers to optimal health and development of self-worth. Despite these experiences, many of these leaders participate as community partners with academic researchers from the Anschutz medical campus on community-based research. This research process has, in many ways, repaired injury and improved mutual respect between physicians and their patients. CBPR has also been a challenging process, and some community members report feeling “burnt-out” (Greg White & Owetta McNeil, Dec 2013). C-STAHR’s video project documents a collection of stories related to healthcare and CBPR research, a process that has not been done in the communities neighboring the Anschutz Medical Campus. Video is unique in the powerful emotional impact it can have on viewers and ability to reach a wide audience regardless of literacy level (Caldwell, 2005). Storytelling through video media has become a growing and proven effective tool for sharing the lives of communities and persons who may otherwise not have a voice (Wexler et al, 2013; Touissant et al, 2011). Furthermore, research shows that actively participating in a digital storytelling process increases confidence with disseminating health stories and personal behavior changes to improve health (Cueva et al, 2013). Video and digital storytelling has also proven an effective method for promoting self-reflection and engaged learning for health professional students (Sandars et al, 2009; Christiansen, 2011).

Project Objectives

• Profile minority community leaders involved in CBPR work from the following neighborhoods: Northeast Park Hill, Greater Park Hill, Stapleton, Northwest Aurora, and East Montclair
• Profile health professional students from the Anshutz Medical Campus involved in CBPR
• Increase local understanding of the effects of discrimination in healthcare and community-based participatory research on provider-
patient relationships and experience • Contribute to health professional student education with a novel video/media resource • Contribute to community knowledge of health and community members’ role in understanding/learning more about health disparities by showing the completed video project at community events • Trigger conversation about community work and burnout, and what can be done to conduct sustainable CBPR Methods We had an initial meeting with community members to gauge their interest in a video project. We asked them what they wanted the goal of the video to be. They decided on three topics: 1. C-STAHR • Share our mission and accomplishments thus far, taking the information back to the communities in which we originated • Create a recruitment tool for community members and students • Create a training tool for medical students interested in participating in CBPR. 2. Burnout • Our CAN members believe that burnout/overload with being involved in community organizations and research is a significant problem in their community and wish to share their experiences • Stimulate conversation ways to reduce/prevent it in the future. 3. Healthcare • Allow the community members to share their views on health, tell their stories related to their personal health, and to discuss how they are affected by the current healthcare system At the initial meeting we also asked our CAN members to generate questions that they would like to be asked that were related to the three goals and decided to have one more meeting to review everyone’s questions before beginning the interview process. The questions used for the interviews are listed below: Healthcare questions: • What negative experiences have you had in healthcare? • How could the patient-provider relationship be improved? • How could the system be improved? • How to make better relationship between patients and doctors? • How do you make a better system for healthcare? • What good experiences have you had in healthcare? • What role to insurance and hospital play in the doctor patient relationship? • Can we change the goals of the hospital or insurance system? C-STAHR questions: • How did the CAN get started? • Who started it? • How did you get involved in this group? • How did you become a community leader? • How did the young doctors get inco • What is your responsibility as a community member? • What have we done since being in existence? • What is the purpose of the CAN? • Why do you continue to be part of C-STAHR? • How do you prioritize in order to make yourself accessible to C-STAHR? • What advice would you give someone that wants to join C-STAHR? Burnout Questions: • What creates burnout for you? • Why is it there are the same people at every meeting in the community? • The majority of the community organizations are working on the same concerns at the same time? • Why don’t the people in the community who comes up with great ideas get credit for the work? • Who gets the credit? • As the community gets older and unable to do the footwork, how do we get the younger people to step up/participate in community research? • What is being done to address burnout or fatigue? • What needs to be done to address burnout or fatigue? • What advice would you give someone who wants to do CBPR? We set two-hour time slots for interviews with each community member, an hour for the interview and an hour to set up and review questions with the interviewee. We held the interview where they preferred, usually in their homes. We had the questions as a guide and did not strictly adhere to them if the community member wanted to talk about something else. After all, this is a CBPR process and we believe that it is important to let the community members share what they want to share. We are currently in the interviewing process and have interviewed eight community members thus far: Pat Vigil, Francisco Subiadur, Michele Wheeler, Myrtle Smith, Oweeta McNeil, Harriet Felton, Greg White, and Patricia Ramirez. We will also continue to interview
other members of C-STAHR including students and 2040 Partners for Health staff. We have begun editing the videos by topic, focusing on C-STAHR and burnout currently. We have recruited two interns from Denver School of the Arts to assist in video editing. We want to include community members in the editing process as well, to let them choose what is important as well as to learn some technological skills. The video is sure to evolve as various members of C-STAHR will have the opportunity to give input and shape what we create. One of our goals is to have the first video(s) completed by early February so that we can show them at the 5th Annual Community Health Summit, the yearly conference held in the community we work with. At the conference there will be a breakout session where we will discuss the video after it has been shown to see what attendees think of community work and community burnout. Evaluation • Community members who participate in the project by sharing their story for a video will complete a questionnaire about their experience and the impact of documenting their story. • Community members who participate in the project will have an opportunity to view their contribution and provide feedback before finalizing the video. • Viewers both in community and academic settings will complete a questionnaire about the videos and their impact on 1) knowledge about discrimination in healthcare 2) knowledge of community-based participatory research 3) further personal impact of video Future Directions We believe that this video project is an initial step to documenting the community’s voice. There are so many experiences, stories, and wisdom that is within the community we work with, and we hope that digital media continues to be a part of C-STAHR’s goals and objectives in the future. Funding This project is funded by a Medical Student Council Innovations Award.
Project Title: A Survey of Barriers to Adult Influenza Vaccination

Thematic Area: Public Health and Epidemiology

Mentor: Tillman Farley
Mentor Department: Department of Family Medicine

Abstract:

Abstract Background As of August 2010, the Advisory Committee on Immunization Practices recommends an annual influenza vaccination for everyone ages 6 months and older. Unfortunately, only 25% of noninstitutionalized adults ages 18 to 64 were vaccinated in 2008, and one of the objectives of Healthy People 2020 is to increase the influenza vaccination rate of this group to 80% by 2020. The Hispanic population, in particular, has historically reported lower flu vaccination rates than non-Hispanic Whites, but most of the research concerning this disparity has focused on elderly or pediatric populations. This study attempts to identify major barriers to influenza vaccination among adult Coloradans, specifically Hispanic Coloradans, ages 18-89.

Methods We conducted a written survey of adult clients of three Salud Family Health Centers to evaluate attitudes toward influenza vaccination using a series of questions addressing respondents' interest in and use of the influenza vaccine, their knowledge of the risks and benefits of the vaccine, and their opinions regarding common reasons for vaccine refusal.

Results Survey analysis confirmed our hypothesis that a lack of patient knowledge about the risks and benefits of the flu vaccine contributes to low vaccination rates. To a lesser extent, survey data also supported our hypothesis regarding the negative impact of patients' belief in several common misconceptions about influenza and the flu vaccine. In addition to provider failure to offer the vaccine, patients' lack of knowledge about influenza vaccine affordability and its status as a recommended vaccination also apparently decreased the likelihood of immunization. Surprisingly, language did not appear to be a barrier to vaccination for Spanish-speaking patients.

Conclusions In order to increase influenza vaccination rates, we as health providers must improve our efforts to not only regularly offer vaccination to patients, but also educate them about influenza and the vaccine.
Project Title: Managing Pediatric Overweight and Obesity in a School-Based Health Center

Thematic Area: Public Health and Epidemiology

Mentor: Steven Federico  Mentor Department: Pediatrics, LEADS

Abstract:

Pediatric obesity is a growing problem nation-wide. Children in poverty are at higher risk of being overweight or obese and also have more barriers to accessing healthcare. School-based health centers have great potential as a solution to providing excellent care to overweight or obese children, though there are currently many barriers, including provider discomfort with doing so and lack of resources available to them. After a thorough literature review, we developed a toolkit that included resources for providers in these school-based health centers for addressing pediatric overweight and obesity. The toolkit was distributed to all of the school-based health centers in Colorado and made available on the Colorado Association for School-Based Healthcare's website. The impact of the toolkit has yet to be determined.
Project Title: Serum Phosphorus and Fibroblast Growth Factor 23 (FGF23) do not Modify the Association between Angiotensin II Inhibition and Outcomes in Patients with Advanced Chronic Kidney Disease

Thematic Area: Clinical Science

Mentor: Michel Chonchol
Mentor Department: Department of Nephrology

Abstract:

Background: Renin-angiotensin-aldosterone system (RAAS) blockade is the cornerstone of pharmacologic treatment for proteinuric chronic kidney disease (CKD). However, most evidence for the efficacy of the commonly used agents, angiotensin-converting-enzyme inhibitors (ACE-I) and angiotensin-receptor-blockers (ARB), comes from studies that excluded patients with advanced stages of the disease. Furthermore, the level of RAAS-blockade achieved through ACE-Is/ARBs is not complete and may be affected by many factors, including mineral abnormalities. Two mineral abnormalities that are commonly seen in advance CKD (aCKD) are elevated serum levels of phosphate and FGF23. Therefore, in this post hoc analysis of the HOST study, we analyzed the efficacy of ACE-I/ARB treatment in decreasing progression to ESRD and all-cause mortality in patients with severe CKD, and we further stratified our analysis by increasing serum levels of phosphate and FGF-23.

Methods: We analyzed the effects of ACE-I/ARB treatment in 1753 subjects with advanced CKD (1099 CKD, eGFR=18 ±6 ml/min/1.73m 2; and 654 ESRD) who participated in the Homocysteine in Kidney and End Stage Renal Disease study. Outcome measures were dialysis initiation for those with CKD and death in the whole cohort. Cox regression models adjusted for important confounding variables and propensity score analysis were used to assess the association of ACE/ARB use with dialysis initiation and death. Analyses were stratified by serum levels of phosphorus and FGF23.

Results: Average age was 66 ±12 years, 36% were black, with 870 (50%) taking ACE/ARB. Over a mean follow-up of 3 years, there were 714 (41%) deaths and 615 patients (56%) initiated chronic dialysis. In adjusted analyses, all subjects treated with ACE/ARB had a significantly lower risk of death [HR 0.81 (95% CI, 0.70-0.95; p=0.007)] and those with CKD had lower risk of dialysis initiation [HR 0.86 (95% CI, 0.73-0.97; p=0.03)]. Serum phosphorus or FGF23 levels did not significantly modify the association between ACEI/ARB usage with each outcome (p interaction 0.4 for all-cause mortality and P interaction 0.7 for dialysis initiation).
Conclusions: ACEI/ARB usage is associated with a decrease risk of kidney disease progression and death in advanced kidney disease even when simultaneously accompanied with higher serum phosphorus and FGF23.
ABSTRACTS

Tucker, Ryan

Project Title: Homelessness and Suicide among Veterans: Results from the National Violent Death Reporting System

Thematic Area: Public Health and Epidemiology

Mentor: Carolyn DiGuiseppi
Mentor Department: School of Public Health

Abstract:

Veterans are at greater risk for suicide than the general population. A high proportion of US veterans experience homelessness. Little is known about homeless veterans who die by suicide. In multivariate analysis of 2003-2009 data from the National Violent Death Reporting System, homeless veterans who died by suicide were more likely to have alcohol or other substance abuse problems (Adjusted Odds Ratio [AOR]=2.16; 95% CI: 1.31, 3.58), and recent job or financial problems (AOR=1.88; 1.13, 3.11) and to be unmarried (AOR=3.33; 1.89, 5.88), than non-homeless veterans who died by suicide. They were also more likely to self-injure in a nonresidential location (natural area, AOR=8.21; 4.30, 15.69; roadway, parking, sidewalk, AOR=5.39; 2.99, 9.69) and to use hanging rather than firearms as the means of suicide (AOR=3.77; 2.17, 6.55) compared to non-homeless veterans. Clinicians and suicide prevention programs should take into account the unique characteristics of this population.
ABSTRACTS

Weisenthal, Laurin

Project Title: Estimated blood loss during dilation and evacuation for intrauterine fetal demise vs. pregnancy termination.

Thematic Area: Clinical Science

Mentor: Kristina Tocce  Mentor Department: OB/GYN

Abstract:

Objective. To assess estimated blood loss (EBL) for dilation and evacuation (D&E) performed for intrauterine fetal demise (IUFD) compared to D&E performed for all other indications for live pregnancy termination. Study Design. This retrospective chart review of patients from a gynecologic unit of an urban university-affiliated medical center involves a large case series of D&Es ranging from 12 and 1/7 to 23 and 6/7 weeks of gestation performed between January 2006 and April 2013. Patients were divided into two groups based on whether the D&E was performed for IUFD or pregnancy termination. Gestational age, indication for D&E, incidence of post-abortal hemorrhage (>500mL), coagulation tests, complications during or following the procedure, administration of uterotonic, and number of blood products administered were recorded to evaluate factors associated with hemorrhage risk. Results. Pending completion of data collection. Conclusions. Pending completion of data analysis.
Wojcik, Jay

**Project Title:** Wnt Signaling Modulation Following Status Epilepticus; an Immunohistochemical Analysis

**Thematic Area:** Basic Science

**Mentor:** Audrey Yee  
**Mentor Department:** Peds-Neuro (former)

**Abstract:**

Epilepsy is a disease that affects millions of people worldwide. There are many drug treatments which suppress seizure activity, but there is no known cure or preventative therapy. Epileptogenesis is the process where the brain develops epilepsy after a precipitating insult. There is a concerted research effort to better understand epileptogenesis, particularly toward investigating the molecular and cellular pathways which underlie this process. The Wnt pathway is one such pathway which has been implicated in epileptogenesis. In this study we attempt to expand on previous data from our lab which showed Wnt being upregulated 7 days post status epilepticus (SE is a prolonged seizure which promotes epileptogenesis) in our rat model. Through immunohistochemical staining we were able to show a spatial expression pattern of B-Catenin (Wnts downstream effector) in the subgranular zone of the hippocampus. The SGZ of the hippocampus is a known neurogenic site in the brain, implicated in epileptogenesis. These results expand on the characterization of Wnt signaling in epileptogenesis, and may hopefully lead toward further investigations to explore therapeutic targets for the prevention of epilepsy.

Wolf, Chelsea

**Project Title:** An Assessment of University of Colorado School of Medicine's "Spirituality and Medicine" Curriculum

**Thematic Area:** Humanities, Social Science and Education

**Mentor:** Jacqueline Glover  
**Mentor Department:** Center for Bioethics and Humanities; Departments of Pediatrics and Preventative Medicine and Biometrics

**Abstract:**

The majority of Americans report that religion is important to them, and multiple studies indicate that patients wish to have some amount of spiritual interaction with their physicians. Despite this, physicians are unlikely to address spiritual concerns with their patients. Over the past 20 years, medical schools have begun to introduce courses on religion, spirituality and medicine into their curriculum in response to this dichotomy. The University of Colorado received a four-year grant
supporting this effort from The George Washington Institute for Spirituality and Health. A structured spirituality and medicine curriculum was designed and implemented from 2005-2009. In order to determine the impact the curriculum has on medical student attitudes and beliefs regarding this topic, a 14-item survey was administered to medical students prior to beginning, and after each phase of, the curriculum. Our findings support the impact of the curriculum on students attitudes and beliefs, particularly on second-year students. Additionally, students who report themselves as spiritual or religious are more likely to recognize the impact of spirituality on health, to feel comfortable addressing spiritual issues with patients, and to feel motivated to improve their practice of discussing these issues in a healthcare setting. Finally, we found that time is the most common perceived barrier to integrating religion and spirituality with patient care.