



SCHOOL OF
**MEDICINE &
DENTISTRY**
UNIVERSITY *of* ROCHESTER
MEDICAL CENTER

2018

Annual Medical Student Abstract Journal

Sponsored by:

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SUMMER RESEARCH

Buswell, Mary

Preceptor

Rita Tamara Konetzka, PhD

University of Chicago

Department of Public Health Sciences

Lisa Vargash, MD

University of Rochester Medical Center

Department of Medicine: Geriatrics and Aging

Co-Authors

Tonie Sadler, PhD Candidate

Harold Pollack, PhD

University of Chicago

School of Social Service Administration

Daniel Brauner, MD

University of Chicago

Department of Medicine – Geriatrics and Palliative Medicine

Medicaid Policy and Setting of Care for Older Adults with Alzheimer's and Other Dementias

Introduction

The United States is experiencing unprecedented growth in both the number and proportion of older adults in our population. Part of this growth comes from longer lifespans, and part comes from the aging baby boomer generation, who turn 65 between 2011 and 2030.¹ By 2035, adults over the age of 65 will outnumber children under the age of 18 for the first time in US history.² The CDC estimates that by 2050, there will be almost 89 million older adults in the US, more than double the number recorded in 2010.¹ An important subset of the aging population is older adults with Alzheimer's disease and other dementias, as they have unique long-term care (LTC) needs. The number of older adults with Alzheimer's disease is projected to grow from 5.5 million in 2018 to 13.8 million in 2050.³ The aging population poses many questions for the US healthcare system, as insurers, providers, and families seek to provide coverage and care for a larger population of older adults.

One recent adaptation Medicaid has made to accommodate an aging population is a shift away from institutional care and toward Home- and Community-Based Services (HCBS) for older adults. There are several reasons for this shift, including preferences of older adults to age in

their homes,^{4,5} quality concerns with institutional LTC,⁶⁻⁸ and the Olmstead decision of 1999, which required that community-based services be a viable option when deemed appropriate. Whereas in 1990, 87% of Medicaid LTC spending was for institutional care, now nearly 50% is spent on HCBS.⁹ Despite state Medicaid programs' shift toward HCBS as the preferred investment in LTC, the potential impact of this shift has not been well studied. Further research is needed to understand how HCBS and nursing home care compare in terms of quality, cost-effectiveness, and caregiver experience. This project seeks to address the qualitative aspects of comparing HCBS and institutional care for older adults, and specifically those with Alzheimer's Disease and other dementias, as they have increased care needs and caregiver burden tends to be higher.^{10,11}

Objectives:

This project focused on reviewing existing qualitative literature and developing an interview guide and study materials that can be used to understand the qualitative aspects of caregiver and recipient experience in navigating the decision about setting of care for an older adult with dementia. In particular, this study sought to understand the following aspects of HCBS and institutional care use:

- (1) How do people think about the choice between HCBS and nursing home care?
- (2) How does state policy impact the choice between HCBS and nursing home care? Do available options and the decision-making process differ between states with different Medicaid policies?
- (3) What have been the outcomes of the decision for the patients and their family?

Methods:

In order to understand the impact of the shift toward Medicaid funding for HCBS, this project sought to review existing literature; interview key informants in the fields of LTC, geriatrics, Medicaid policy, and social work; and use this information to design an interview guide that can be used to conduct qualitative interviews with caregivers of older adults with dementia. The interview guide developed in this project will be used by the University of Chicago Department of Public Health Sciences in a study interviewing 100 caregivers for older adults with dementia across 4-6 states with different Medicaid LTC policies.

Results:

Literature Review: With the rapid expansion of HCBS funding and utilization, and a decline in institutional care, there is an emerging body of research that has sought to study these two types of long term care settings in order to evaluate their quality, costs, and effectiveness. Quantitative studies focus primarily on understanding variations in expenditures and health outcomes by care setting, but qualitative literature examining setting of care is sparse. Three major themes identified in the existing qualitative literature include frameworks for the decision-making process about type of LTC, experiences with LTC by site, as well as direct comparisons of home-based and institutional care settings.

Literature that focuses on LTC decision-making includes several frameworks that identify factors involved during the decision-making process. A common theme across these frameworks is a point of “crisis” that usually precedes LTC decision-making. Other factors such as the availability of services, personal preferences, professional opinions, and the individual’s functional capacity are also considered when making LTC decisions. Research about experiences with LTC identifies specific barriers to HCBS access, including long wait times and extensive paperwork. Another notable theme across experiences with LTC was the emotional stress that family caregivers face when their loved ones are receiving care or when there is a change in care setting and caregiver role. When directly comparing HCBS and institutional LTC, the studies reviewed found that HCBS was associated with lower staff competence and access barriers such as a more complicated application process compared to nursing home care.

Interview Guide: Information from the literature review and insights from interviews with key informants in the field of LTC were synthesized to inform the development of an interview guide that will be used to conduct hour-long semi-structured qualitative interviews with caregivers of older adults with dementia.

Conclusions

Though existing literature has used qualitative methods to examine the decision-making process and experiences with care, there is very little research that directly compares institutional care with HCBS. Furthermore, though existing literature highlights barriers to HCBS use and challenges with LTC in general, it fails to address how state policy may impact decision-making and experiences with LTC.

This project aimed to address these gaps by creating an interview guide that can be used to interview caregivers of older adults with dementia who receive care via HCBS or nursing home care in states with varying Medicaid LTC policy. By conducting interviews with caregivers who have chosen HCBS as well as those who have chosen nursing home care, our interview guide will be able to elucidate themes associated with decisions to use one setting over the other, as well as reflections on experiences with each care setting. This guide will be used in an ongoing project at the University of Chicago Department of Public Health Sciences.

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Calderon, Thais
Negron, Tianna

Preceptors
Igor Gosev, MD
Peter Knight, MD
University of Rochester Medical Center
Department of Cardiac Surgery

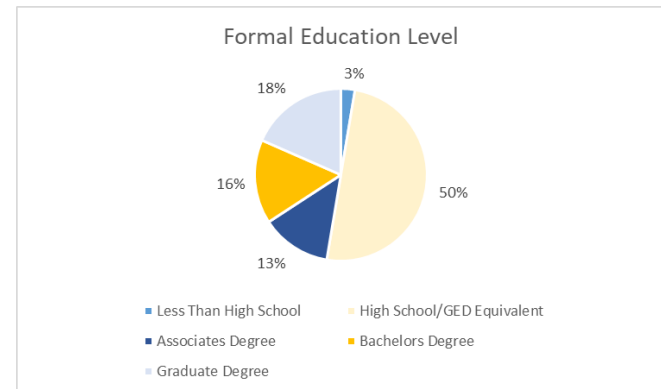
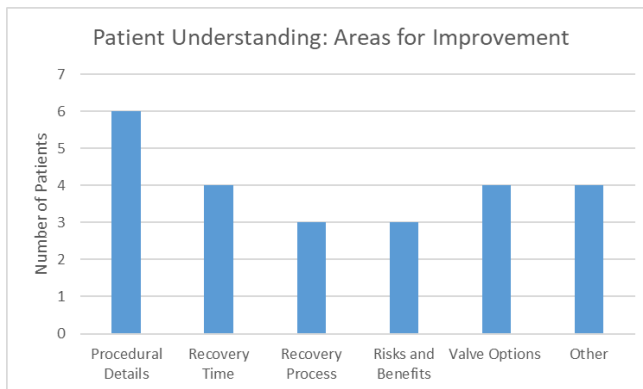
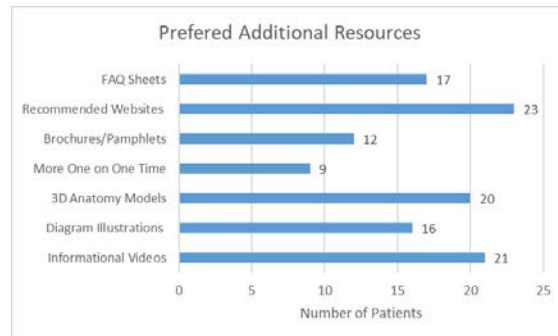
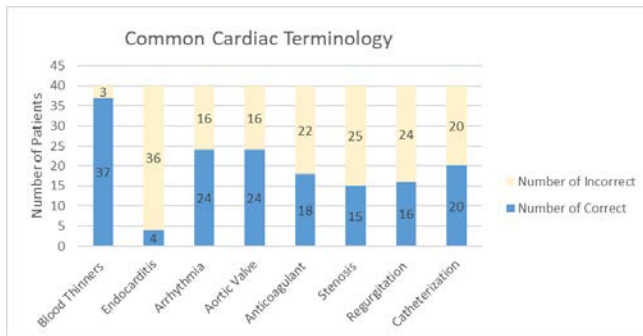
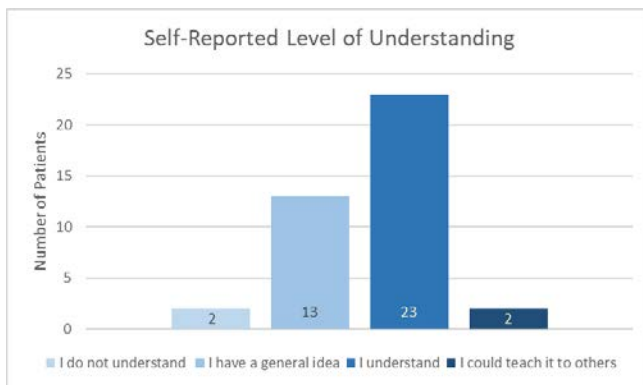
Patient Education and Shared Decision Making in Aortic Valve Replacement Procedures: A Survey Assessment of Surgical Patients at Strong Memorial Hospital

BACKGROUND: The brevity of clinical interactions presents a potential loss of access to reliable information that could be gleaned from shared decision making during these visits. This potential lack of information may also be coupled with misinformation derived from a number of sources afforded by the Internet, ranging from social media and blog sites to Wikipedia. Furthermore, despite in-clinic resources, there is still potential for this disconnect in information sharing, as the average American is at a 7th to 8th grade reading level (1). While little research has looked into the effect of patient education and understanding in surgical decision making, the issue of poor health literacy is well recognized in other areas of medicine. Individuals with low health literacy are less likely to comprehend preventative medicine and health promotion programs, thus they are also less likely to participate and more likely to be hospitalized (2). Identifying these patients can be a challenge as many do not seek out help. When interviewed, patients with poor health literacy stated they felt a profound sense of shame about their level of understanding. They also reported that these emotions were compounded by the hospital staffs frustration when they were unable to complete the forms, making them less likely to disclose their literacy level (3). In general, surgery carries a number of serious risks for patients to consider, and thus clear communication and complete patient understanding is essential. Areas of disconnect can range from outlined potential risks and benefits to pre-op instructions, post-op care, and prescription management.

METHODS: All surgical patients who were scheduled to undergo an AVR procedure at URMH through the Department of Cardiac Surgery between May 2018 and September 2018 were asked to participate in a standardized phone survey to evaluate the aforementioned measures. Eligible patients must be 18 years of age or older and have the capacity to make their own medical decisions. Patients also must be provided with more than one option for valve type and / or procedural approach to be included. Patients were informed of the call at their initial surgical appointment and were called 1-2 weeks prior to their surgery, at which time verbal consent for participation in the telephone interview and "one and done" chart review was obtained.

RESULTS: 65% of patients (N=26) were given more than one option for both the valve type and the procedural approach, and all other patients (N=14) were given options for either the valve type or approach, highlighting patient centered decision making required for this surgical procedure. 20% of patients (N=8) were not able to state nor describe the correct procedure that they were scheduled to undergo, and 7.5% of patients (N=3) were unsure of why they required a procedure. Regarding patients' formal education level, 50% of patients (N=20) have a high school education or less. The average amount of cumulative time spent that patients reported discussing the procedure with their cardiac surgeon was 18.5 minutes with 27.5% of patients (N=11) reporting 5-10 minutes of time spent. While 98% of patients (N=39) stated that their questions were answered in a way that they could understand, 27.5% of patients (N=11) described one or more aspects of their operation (i.e. procedural details, recovery, risks and benefits, valve options, etc.) that they wished were explained better at their appointment. Further, 22.5% of patients (N=9) stated that they did not feel they had enough resources to confidently make their decision.

CONCLUSIONS: Based on participant responses and the aforementioned assessments of patients' understanding of their procedural options, there may be some room for improvement in patient education for surgical decision making in aortic valve replacement. One possible recommendation based on patient feedback is providing a list of recommended websites, especially as an increasing number of patients utilize the internet as a resource. Additionally, 77.5% of patients (N=31) utilized the brochure provided at their appointment to learn more about their procedure, and this supports the notion that patients do find value in clinic resources that are provided which could inform future interventions. However, some gaps in knowledge based on lower health literacy and education level may confound the effectiveness of these resources, which should be tailored to include this demographic. Finally, 5% of patients (N=2) responded that they do not understand their procedure, but it is clear that there are aspects of the process that more patients are also unclear about (evidenced above), which serves as a reminder of the utility in mirroring when verifying with patients that they understand what has been discussed. Limitations in this study include the small N=40 which may not be representative of the general patient population, and 22 patients were unable to be contacted when called which could represent a sampling bias. Further, the subjective nature of patient reported questions and challenge with standardizing definitions is also a possible methodological bias in this study.



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Dillen, Jonathan

Preceptor

John Markman, MD

University of Rochester Medical Center

Department of Neurosurgery

A Case for Novel Pharmacologic Management of Trigeminal Neuralgia and Proposed Retrospective Analyses of Intrathecal Baclofen Pump Efficacy and Complications

Abstract:

Trigeminal neuralgia is a rare, debilitating chronic pain disorder. First-line analgesic treatment of Trigeminal neuralgia includes carbamazepine and its analogs. This treatment paradigm has gone largely uncontested despite a well characterized analgesic tolerance that develops with chronic administration. There are multiple therapies with a similar mechanisms of action available for other, unrelated indications. This report describes a 41 year old female who originally presented with classic clinical features of episodic trigeminal neuralgia affecting a lateralized V3 distribution. First-line anticonvulsant treatment of carbamazepine induced a severe allergic reaction. Second-line treatments did not produce significant positive outcomes. Given her ineligibility for surgical intervention for this syndrome, a trial of lacosamide was initiated. Lacosamide completely and durably ablated the episodic lancinating pain to the extent commonly observed with first-line sodium channel blockers. We propose investigation of lacosamide monotherapy for the indication of trigeminal neuralgia in patients unresponsive to first and second-line pharmacologic options and ineligible for surgical intervention.

Oral baclofen is often used as therapy for muscle tightness and spasms caused by spasticity in multiple sclerosis, cerebral palsy, and other central nervous system conditions. Intrathecal baclofen pumps can be precisely controlled to produce on-target central nervous system effects thereby increasing the drug's therapeutic index relative to oral administration. Our aim was to conduct a retrospective, non-interventional study in the longitudinal utilization and adverse events related to intrathecal drug delivery of baclofen. The proposed review will characterize the patterns of use, long-term efficacy, and complications of baclofen delivery for spasticity using a large patient population.

Fleming, Donald

Preceptor

Daryl Smith, MD

University of Rochester Medical Center

Department of Anesthesiology and Perioperative Medicine

Protein Kinase C and Neuropathic Pain: A Systemic Review of the Literature

Protein kinase C, commonly known as PKC, consist of a family of isozymes that regulate a plethora of cellular responses. The structure of PKC includes a C-terminal catalytic region and a N-terminal regulatory region. The PKC family is divided into three groups: conventional, novel, and atypical enzymes that have different binding mechanisms for activation. Conventional PKC enzymes require the binding of a phospholipid and a diacylglycerol (DAG) to the C1 region, and the binding of a calcium ion to the C2 region for activation. Novel PKC enzymes, like conventional PKC enzymes, also require the binding of diacylglycerol group to the C1 region for action. However, it does not require the binding of a calcium group to the C2 region. Lastly, atypical PKC enzymes are a unique type because they do not require the binding of a second messenger to be activated. In this study, we will look at the role of PKC isozymes in neuropathic pain. Studies have shown that PKC plays an important role in pain regulation and signaling in the body. Specifically, PKC isozymes are known to be potential therapeutic treatment for chronic pain conditions. Signal transduction has been shown to play a role in neuropathic pain by way of different PKC pathways.

Geiger, Josh

Preceptors

George Porter, MD, PhD

University of Rochester Medical Center

Department of Pediatrics, Cardiology

Alex Paciorkowski, MD

University of Rochester Medical Center

Departments of Neurology and Pediatrics

Myopathy Associated Mitochondrial Genome Variants in Congenital Heart Disease**BACKGROUND:**

Congenital heart defects (CHD) are the leading causes of mortality from birth defects, affecting about 1 percent of live births. The presence of heart defects at birth, an increased recurrence risk of CHD in families and the identification of *de novo* nuclear single nucleotide variants provides strong evidence for the role of genetic variation in the etiology of CHD. Damaging sequence variations in mitochondrial genome tRNAs and oxidative phosphorylation proteins have been strongly associated with mitochondrial myopathy, encephalomyopathy, and cardiomyopathy. Despite this relationship, little literature exists exploring the role of mitochondrial genetic variation in the development of heart anatomy. We therefore sought to test the hypothesis that sequence variations in the mitochondrial genome are associated with CHD in a large cohort of sequenced affected individuals.

METHODS:

Whole genome sequences of 1,207 individuals, including 481 families, completed by the Pediatric Cardiac Genomics Consortium as a part of The Congenital Heart Disease Genetic Study were analyzed for mitochondrial sequence variations. Individuals had no prior diagnosis of known genetic syndromes. Sequence reads from mitochondrial genomes were extracted from WGS bam files. Reads were then realigned to the Reconstructed Sapiens Reference Sequence (RSRS) and variants were called using MToolBox, an automated pipeline for alignment, assembly, and annotation of mitochondrial genomes. Further variant annotation was completed with annovar using data from mitomap, MitImpact and HmtVar. Phenotypic data on each patient was obtained from HeartsMart and further analysis was conducted in R. Variants with a read depth of less than 200 and a heteroplasmy fraction of less than 0.10 were excluded from the analysis. Mitochondrial variants previously associated with

RESULTS:

A total of 63 individuals (27 affected probands, 1 affected and 17 unaffected mothers, 16 unaffected fathers, and 2 affected siblings) were found to possess previously reported myopathy-associated sequence variations. The analysis identified 13 different sequence variations in the cohort, 5 associated with mitochondrial myopathy, 4 with encephalomyopathy, and 4 with cardiomyopathy. Interestingly, 18 mother-proband pairs showed transmission of alleles from mother to proband with 3 pairs transmitting two sequence variations. There was one example of transmission from an affected mother to a proband and one *de novo* single nucleotide variant. Of the 27 probands with a disease associated variant, 16 (55.56%) reportedly underwent cardiac surgery. This was significantly increased (Fisher test, p: 0.0049, OR: 3.22) when compared to the 140 out of 451 (31.04%) probands without a disease associated variant who were reported to have had a cardiac surgery.

CONCLUSIONS:

The identification of previously reported disease-associated mutations in both probands and unaffected parents suggests other factors exist that modulate cardiac phenotypes. Although other factors are likely the primary drivers of these phenotypes, sequence variations in genes associated with mitochondrial function may represent disease modifying factors. This idea is supported by the increased rate of surgical intervention in patients with these mitochondrial genetic variations. Our findings potentially expand the spectrum of phenotypes associated with mitochondrial genome mutations into the realm of structural heart disease.

Gershteyn, Anna

Preceptors

Christopher Tarolli, MD

University of Rochester Medical Center

Department of Neurology

Characterization of trends in end of life care in individuals with Parkinson Disease

Background: Parkinson Disease (PD) is a chronic neurodegenerative disorder that is characterized by advancing motor symptoms (tremor, rigidity, bradykinesia, and postural instability) and non-motor symptoms (depression, autonomic dysfunction, sleep disorders, and dementia). There are no curative or disease modifying therapies for this disease at this time. Thus far, there has been limited characterization of care at the end of life for individuals with PD. By characterizing trends in end of life care, we may be able to identify unmet needs and facilitate the development of meaningful interventions for those living with PD.

Methods: We conducted a retrospective chart review of deceased individuals who carried a diagnosis of idiopathic PD (ICD-10 code G20) in the University of Rochester Medical Center (URMC) electronic medical record in the last 5 years and had at least one outpatient neurology encounter with a URMC neurologist. We collected data on patient demographics, disease symptomatology, medication use, living situation, and advance directive completion, with a focus on the last year of life. Care utilization trends including primary care visits, neurology visits, and palliative care and hospice utilization were evaluated in those with a primary care provider (PCP) in the URMC electronic medical record.

Results: Over 90% of patients required an assistive device to ambulate and 15.7% were wheelchair-bound in their last year of life. The vast majority of PD patients (94%) continued receiving symptomatic therapy through the last year of life. The mean number of neurology visits in the last year was 1.9 (SD 1.6) with 81% of patients seeing a movement disorders specialist. In the last year, 87% of patients saw their PCP, with a mean number of PCP visits of 4.3 (SD 4.2). The mean number of emergency room visits in the last year was 2.2 (SD 2.3) visits. 29% of the patients had a palliative care consult. Of those patients, 51% had the palliative care consult within a week of their death, 67% within the last month and 85% within the last year. Those who had a palliative care consult were significantly more likely to be admitted to hospice.

Conclusions: Overall, in the last year of life, PD patients were considered high utilizers of outpatient services and moderate users of emergency room services when compared to the general older adult population. Our results support the idea that there is an increased need for palliative care intervention earlier throughout the course of the disease in order to manage the high degree of disease burden in the later stages of PD.

Gomez, Julia

Preceptor

Krystel Huxlin, PhD

University of Rochester Medical Center

Flaum Eye Institute

Natural Progression of Vision Loss in Patients with Occipital Stroke

Visual impairment is a common outcome for stroke patients when the lesion affects the primary visual cortex (V1), resulting in a homonymous hemianopia (HH). This form of vision loss can severely impact functioning and quality of life, despite that the early period (up to 24 weeks post-stroke) is characterized by the possibility of spontaneous recovery of some of the vision lost (Zhang et al., 2006). Beyond the first 24 weeks post-stroke however, the visual deficit is thought to become stable and permanent (Zhang et al., 2006). Yet, recent work using more stringent enrollment criteria and quantitative analysis of Humphrey visual fields (HVF) s—the clinical standard for measuring hemianopic defects—suggested that chronic, hemianopic defects are not stable; instead, patients may gradually lose vision over time (Cavanaugh and Huxlin, 2017; Wang et al., 2017). Here, we verified this dual phenomenon—spontaneous recovery early post-stroke and vision loss in chronic patients—and asked whether the degree of recovery/loss was affected by gender, age at stroke and severity of initial visual deficit. We reviewed the e-Records of URM C patients with the billing code “homonymous hemianopia” and selected those who met the following criteria: ages 21-75 years-old at time of stroke, with no other neurological or ocular diagnoses that significantly impacted their vision or ability to perform HVFs. For patients who met these requirements, we retrieved HVFs and used custom Matlab programs to import and analyze the raw data from each machine. In total, out of 247 patients with HH, 47 qualified for the proposed analyses. Across patients, we found that the pattern Mean Deviation (MD)—a measure of the severity of the visual defect relative to a normative database of age-matched controls—increased significantly when the HVFs were repeated between 0 and 24 weeks post-lesion. However, for HVFs performed more than 24 weeks post-lesion, the average change in MD was negative. In other words, during the subacute phase (<24 weeks post-lesion), patients showed spontaneous improvement in their HVFs. However, in the chronic phase (>24 weeks post-lesion) and without any therapeutic intervention, patients’ HVFs worsened. Surprisingly, there was no significant correlation between gender, age at stroke, or initial MD (i.e. size of deficit) on the change in MD seen either in the subacute or chronic phases post-stroke. Altogether, these findings provide preliminary confirmation of our hypothesis that, without intervention, the visual deficit of stroke patients improves, then eventually worsens over time, reaffirming the need to develop early, therapeutic interventions for hemianopia. However, it also appears that major demographic factors (gender, age at stroke and size of stroke) have minimal

impact on spontaneous changes observed. Whether these factors affect the ability to train and the efficacy of therapeutic interventions is the focus of ongoing investigations.

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Gurditta, Kunali

Preceptor

Peter Wyman, PhD

University of Rochester Medical Center

Department of Psychiatry

Co-Authors

Anthony Pisani, PhD

Chelsea Keller Elliot, MS, LMFT

Lacy Morgan-Develder, MS, LMFT

Chelsey Hartley, PhD

Karen Schmeelk-Cone, PhD

University of Rochester Medical Center

Department of Psychiatry

A Measure of Trainer Adherence in a Novel Suicide Prevention Program for the US Air Force: Development and Reliability

Objectives: (1) To develop a fidelity checklist and coding manual to rate trainer adherence to the intervention manual of a new suicide prevention intervention for young enlisted Air Force personnel, and (2) to achieve adequate (at least 0.8) interrater reliability among three coders using the measure and coding manual.

Background: Suicide is the second leading cause of death among US military personnel (Ritchie, Keppler, & Rothberg, 2003), and rates are rising, particularly in the Air Force (Department of Defense, 2012; US Surgeon General & National Action Alliance for Suicide Prevention, 2012). Early career Air Force personnel are at greater risk for suicide (Knox et al., 2013). Despite universal access to behavioral health care, fewer than half of the individuals who die by suicide in the military were ever in care, and only a fraction of them openly expressed suicide ideation or intent (Department of Defense, 2012). In light of these observations, military suicide prevention must encompass a continuum of approaches (Knox et al., 2013), with significant attention given to upstream programming that focuses on strengthening skills and relationships that are protective against suicide. Some evidence suggests that military prevention training improves indicators of wellbeing (Crabtree-Nelson, 2017; Eidelson, 2011; Reivich, 2011); however, to our knowledge no prevention programs that focus on building social protective factors in early-career personnel have been rigorously tested for potential contributions to suicide prevention. To address this gap, the Department of Psychiatry's School and Community Prevention Program developed Wingman-Connect, an intervention focused on strengthening protective factors, including healthy peer norms, unit cohesion, relationship function and satisfaction, emotion self-

regulation, and help-seeking utilization, among newly enlisted Air Force personnel. Funded by the Department of Defense (DOD#W81XWH-12-1, PI: Wyman), a randomized controlled trial (RCT) of Wingman-Connect began in October 2017 at Sheppard Air Force Base in Texas.

Intervention fidelity is a critical component of determining the effectiveness and feasibility of disseminating an intervention (Breitenstein, et al, 2010). Much of intervention fidelity literature focuses on treatment, but there is prior work focusing on training in universal and indicated prevention (Cross & West, 2011; West et al., 2014, 2015, 2017). Fidelity is a broad term typically defined as the extent to which an intervention is delivered as intended by its developers (Aarons, Hulburt, & Horwitz, 2010; Brownson, Colditz, & Proctor, 2012). Specifically in the training fidelity literature, fidelity has two dimensions: adherence and competence (Cross & West, 2011). Adherence is typically one of the first measured components of fidelity, particularly because intervention training manuals establish guidelines for implementing the intervention as intended.

Wingman-Connect focuses on training technical school classes of newly enlisted Air Force personnel to build caring and cooperative bonds and to strengthen protective factors in four areas, i.e., the Four Cores. The Four Cores are Kinship (healthy relationships), Guidance (support from mentors and mental health/medical services), Purpose (goals, sense of being valued and valuable), and Balance (healthy activities, keeping all the parts of our lives strong and in perspective). Wingman-Connect was significantly adapted from Sources of Strength, a universal school-based suicide prevention intervention that aims to build protective factors and change coping norms, as well as change attitudes related to healthy youth-adult relationships (Wyman et al., 2010). Wingman-Connect diverges from Sources of Strength by placing approximately one-half of the intervention focus on promoting unit skills and competencies (training class), including shared purpose. Wingman-Connect modules are outlined in a training manual for three two-hour in-person training sessions and a one and one-half hour booster session one month later, followed up by contact via text messaging and video for six months.

In the ongoing RCT of Wingman-Connect, 180 classes with 1,500 Air Men-in-training in 26 cohorts will be randomly assigned (by class unit) to either Wingman-Connect or a control intervention (stress management training) over 18 months. Currently, two different trainers co-lead the four in-person training sessions at Sheppard Air Force Base. In order to ensure the fidelity of the intervention among different trainers and over time, a measure of trainer adherence is required. This measure may also prove essential to disseminating Wingman-Connect if RCT findings warrant broader use.

Methods: The development of our adherence measure and coding manual was guided by previous research done by Cross and colleagues (2014, 2015) and Hartley (2017). Our team did this in three stages: (1) orientation to material, (2) development, and (3) validation. In stage 1, we took the following steps: (1) becoming familiar with the Wingman-Connect intervention manual, and (2) listening to audio recordings of one full training session conducted by the lead trainer and two modules conducted by another trainer. In stage 2, we took the following steps: (3) determining key intervention modules in collaboration with the intervention developers and lead trainer by taking a sampling (due to time constraints) of modules that captured important

content and skills that are representative of the training, (4) creating an adherence checklist of items from the training manual for the key modules, (5) coming to a consensus on the final checklist items with other team members, (6) creating a coding manual, (7) using the checklist and coding manual to code only training sessions from Step 2, and (8) discussing any issues we had while coding with other team members and modifying the checklist and coding manual accordingly. In stage 3, we took the following steps: (9) training a third coder, and (10) determining interrater reliability using intraclass correlation coefficients (ICC).

Results: We developed a checklist consisting of 52 items, covering eight of the 33 modules in the intervention. The number of items for each of the eight modules ranged from 3 - 17. Checklist items for a module designed to elicit stressors in Air Force life included: "Trainer asks about top stressors Airmen have faced since enlisting in Air Force," "Trainer summarizes/restates at least one Airman's response about stressors," "Trainer transitions between individuals sharing stressors by bringing discussion back to group consensus." Checklist items for other modules included statements such as: "Trainer introduces kinship as healthy relationships and gives examples from posters," "Trainer summarizes with a statement about purpose being about having goals/direction or giving us a sense of serving someone/something bigger than ourselves," "Trainer summarizes with a statement about guidance being about learning from others and providing guidance for others," "Trainer asks Airmen about participation in a broad range of different healthy activities," "Trainer describes network figure," "Trainer notes that students in crisis group together in network figure," "Trainer notes that students who are thriving group together (refers of Group A in network figure)," "Trainer closes with a statement about strengthening purpose/thinking about goals or values to help manage stress or get through transitions," "Trainer closes with a statement about importance of intentionally seeking help/informal guidance," "Trainer makes a statement about class as a whole being stronger than any single member," and "Trainer states that stress is often expressed as anger, anxiety, or feeling down and that remembering the Four Cores at these times is helpful." The coding manual clarified the anchor points (yes vs. no) of checklist items when relevant. Sixteen cohorts were coded by at least two coders. On average, trainers delivered 97.2% of the selected modules as intended (range = 90.3% - 100%). At time 1 (October 2017-January 2018; cohorts 1-5), 95.2% of the selected modules were delivered as intended. At time 2 (February 2018-April 2018; cohorts 6-11), 97.8% of the selected modules were delivered as intended. At time 3 (April 2018-June 2018; cohorts 12-16), 98.5% of the selected modules were delivered as intended. As such, although there was a slight upward trend in trainer adherence increased over time, it remained relatively stable. Interrater reliability was 0.901 (ICC = .901).

Discussion: We developed a fidelity checklist that will serve the needs of an RCT and future dissemination of Wingman-Connect. We achieved high interrater reliability in the samples that were coded, suggesting that intervention components have been operationalized in a clear and straightforward manner. The next step is to use and test the fidelity checklist on training delivered by a broader range of trainers, where greater range of fidelity would be expected. In order to fully determine implementation fidelity, future work needs to address trainer competence. Future

work should also address the relationship between implementation fidelity and intervention outcomes in order to appropriately determine the effectiveness and feasibility of disseminating Wingman-Connect.

Acknowledgements: I would like to thank the University of Rochester Medical Center Department of Psychiatry for generously funding this project. I would also like to thank my preceptors and mentors, Dr. Wyman, Dr. Pisani, Dr. Hartley, Dr. Schmeelk-Cone, Chelsea Keller Elliot, and Lacy Morgan-Develder, for their support and guidance throughout this project. I am also grateful for Matthew Rasmussen's contribution as a coder.

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Hernandez, Cesar

Preceptor

Addisu Mesfin, MD

University of Rochester

Department of Orthopaedics and Rehabilitation

Co-Authors

Giresse Melone, BS

University of Texas Medical Branch

Galveston, TX

Emmanuel Menga, MD

Rishi Balkisoon, MD, MPH

University of Rochester Medical Center

Department of Orthopaedics and Rehabilitation

Ximing Liu, MD

Wuhan General Hospital of the Chinese People's Liberation Army

Department of Orthopaedics

Wuhan, Hubei Province

Jun Zhang, MD

Zhejiang Provincial People's Hospital

Department of Orthopaedics

Hangzhou, Zhejiang Province

Online Ratings of Spinal Deformity Surgeons: Analysis of 634 Surgeons

Study Design

Observational Study

Objective

To evaluate the online ratings of spine deformity surgeons and variables that may affect online ratings.

Summary of Background Data:

Physician review websites (PRW) continue to be an emerging trend in the US, across all specialties. Previous literature with smaller sample sizes revealed that most spine surgeons are

rated on at least one PRW. To date, the online ratings of spinal deformity surgeons have not been evaluated.

Material & Methods

A review of the 2017 Scoliosis Research Society (SRS) Fellowship directory for active fellows and candidate members yielded 634 active members. Online ratings from "Healthgrades" "Vitals" "RateMDs" "WebMD" and "Yelp" were all recorded and scaled from 0-100.

Using SPSS, one way analysis of variance was used to compare differences between multiple groups. A t-test was used to compare differences between two groups. Significance was set at $p < 0.05$.

Results

Nearly all surgeons (98.7%) were rated on at least one PRW. Surgeons in academic practice had significantly higher ratings than those in private practice (84.3 vs. 79.7; $p = 0.00005$). Hospital employed surgeons had significantly higher ratings than those in private practice (85.1 vs. 79.7; $p = 0.0001$). Surgeons in practice for 0-5 years had significantly higher ratings than those practicing for 11-20, and ≥ 21 years respectively, (91.8 vs. 83.6; $p = 0.001$) and (91.8 vs. 81.4; $p = 0.001$).

No significant differences in ratings in regards to sex (83.3 male vs. 80.1 female; $p = 0.368$), specialty (83 orthopaedics vs. 85.1 neurosurgery; $p = 0.199$), geographic location ($p = 0.917$), or fellowship training (84.3 pediatrics vs. 82.5 spine; $p = 0.065$).

Conclusions

Spine deformity surgeons in practice between 0-10 years have higher ratings than more experienced surgeons (practice 21+ years). Academic and hospital employed SRS surgeons had higher ratings than those in private practice. Nearly all (98.7%) SRS surgeons were rated on at least one PRW.

Level of Evidence: IV

Key words:

Online ratings, spine deformity surgeon, scoliosis research society, physician review websites, physician practice

Johnson, Thomas

Preceptors

Edward Lin, MD, MBA

Jianui Zhong, PhD

Rochester Center for Brain Imaging

Co-Authors

Arun Venkataraman

Steven Meyers, MD PhD

Rochester Center for Brain Imaging

Resting state fMRI and the default mode network in mild traumatic brain injury

Introduction

Mild traumatic brain injury (mTBI) is defined as a patient presenting with a non-penetrating impact or trauma to the head and a Glasgow Coma Score (GCS) at 30 minutes post-injury of 13-15 [1]. Epidemiological data is varied, but the incidence has been reported in North America to be as high as 653/100,000 [2].

Sequelae of mTBI include post-concussion syndrome (PCS = headaches, vertigo and dizziness, delayed cognition, memory impairment), as well as fatigue, sleep disturbances, and seizures [3]. PCS disability level and long-term outcomes differ for unknown reasons. In many cases PCS can resolve within 1 month and the vast majority by 3 months without any intervention [4, 5], but some patients develop PCS that persists longer resulting in significant disability and reduction in quality of life due to restrictions on exercise, driving, etc.

The pathophysiology of concussion is generally related to injury that occurs because of acceleration/deceleration of the brain against the inside of the skull. This leads to cortical contusions [6], presence of amyloid precursor protein [7] and diffuse axonal injury, characterized by transection of the axons themselves and subsequent degeneration of the cells – termed Wallerian degeneration [8]. Further damage may be done by the release of excitotoxic neurotransmitters after release of cell contents into the brain parenchyma, similar to stroke pathophysiology [9]. The blood brain barrier may also be disrupted, with potential effects on cerebrovascular regulation [10].

Due to the variation in patient outcomes after mTBI and the unknown etiology behind those which present with long-term disability, it would be potentially helpful to identify a biomarker that could predict which patients are most at risk for persistent PCS or cognitive impairment.

There are some preliminary studies that indicate the promise of MRI to detect such a biomarker of mTBI severity. Disruption of white matter structural networks is seen when measured with MR diffusion tensor imaging (DTI; see 'Methodology') [11, 12]. In addition, disruption of functional MRI (fMRI) networks is seen, indicating altered cognitive circuits [13, 14]. Based on these previous studies, one is needed looking at both the anatomical and physiological disruptions to determine how they are related.

In this study we used fMRI to determine network connectivity measures in the 'default mode network' (DMN) of patients with symptoms of PCS and compared them to healthy controls using resting state fMRI (rs-fMRI).

Methodology

Patients were recruited from the Outpatient Neurology Clinic at Strong Memorial Hospital in Rochester, NY. Criteria for inclusion were any athlete presenting to the clinic with symptoms of PCS and deemed safe to undergo an MRI scan. Age-matched controls were recruited from the undergraduate student athlete body at the University of Rochester.

MRI data were obtained on a 3T Siemens Magnetom Skyra at the Rochester Center for Brain Imaging. Anatomical images were obtained with a 3D MPRAGE sequence, TR/TE = 1200/2.29ms, voxel size = 1.0 x 1.0 x 1.0mm, matrix size = 256 x 256 x 208. Rs-fMRI data were obtained with a motion-corrected EPI sequence with TR/TE = 2200/30ms, voxel size = 4.0 x 4.0 x 4.0mm, matrix size 64 x 64 x 38 with 220 time points. Patients were instructed to look at a blank screen during rs-fMRI acquisition.

All data analyses were performed on a MacBook Pro with a 2.2 GHz Intel Core i7 processor and 16GB of RAM. Rs-fMRI analysis was performed in FSL using the MELODIC package for independent component analysis, a method to regress out noise from time-varying fMRI data sets. A schematic of the workflow is shown in Figure 1.

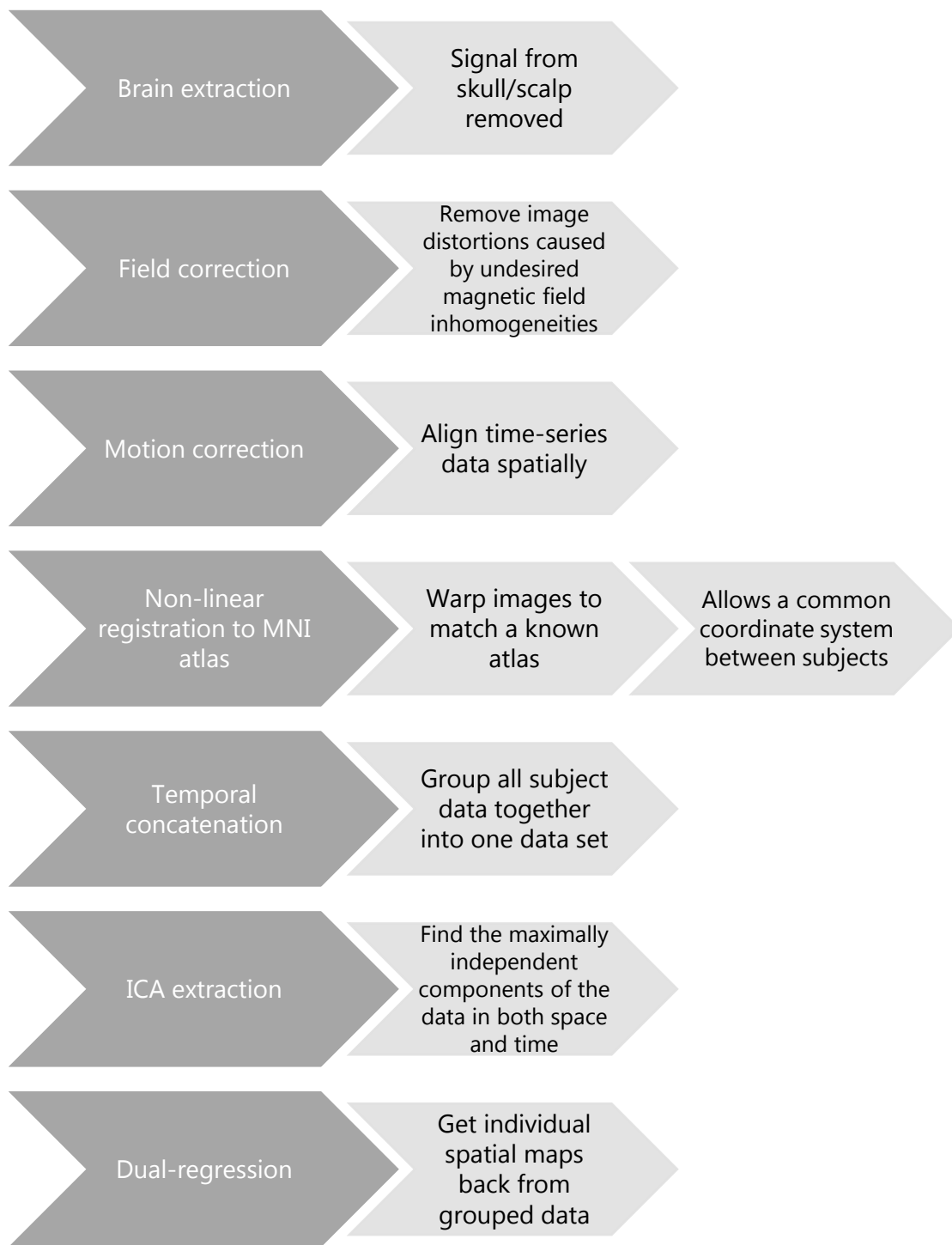


Figure 1: Schematic of data processing pipeline used to extract independent components from resting state fMRI data.

Results

Figure 2 shows the spatial map of a component obtained from an ICA analysis that corresponds to the anatomical regions known to be a part of the default mode network, particularly the posterior cingulate cortex. The false colorization of the image represents the statistical likelihood

that the signal from that particular voxel contributes to the specific component displayed here. In this way, the map is showing regions that are related to one another functionally.

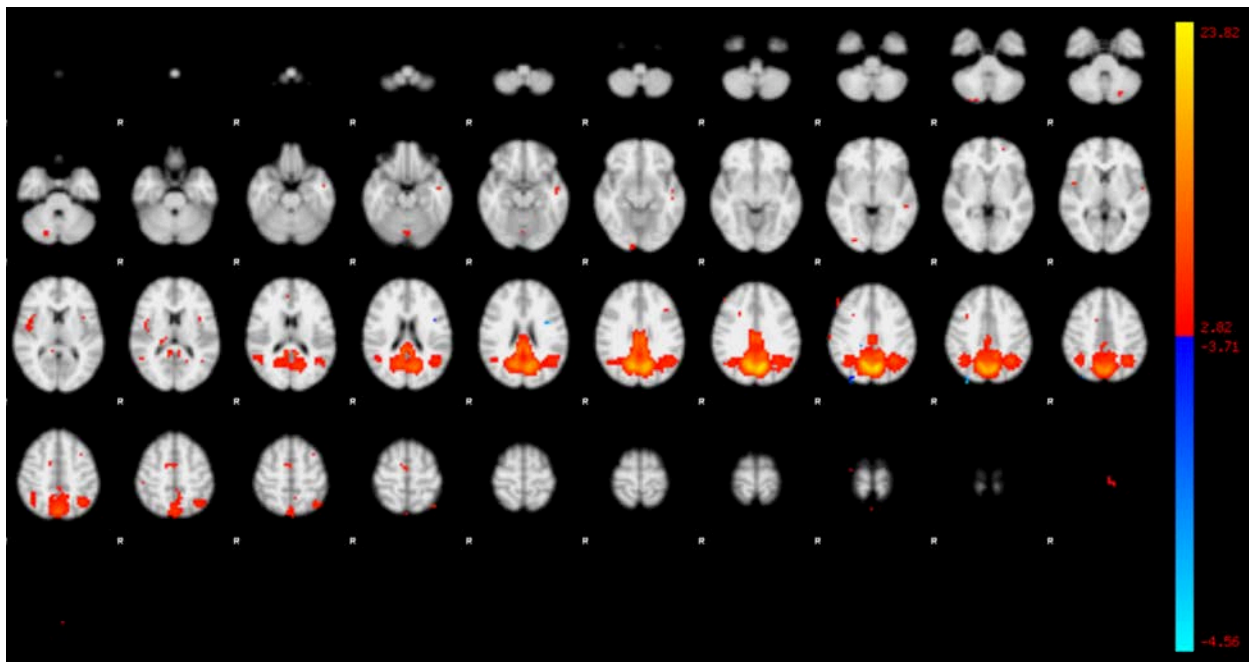


Figure 2: Independent component spatial map of grouped rs-fMRI data showing an aspect of the default mode network. False-colored images represent the statistical likelihood of the data being related with orange being positively correlated and blue being negatively correlated.

Discussion

Preliminary results have shown that our processing pipeline is achieving its goal of extracting default mode network components from rs-fMRI data. This will enable us to perform comparisons between controls and mTBI patients to determine if differences exist between the functional networks of the two groups.

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Jones, Shaunpaul

Rizk, Nina

Preceptor

Adrienne Morgan, PhD

University of Rochester School of Medicine and Dentistry

CACHED

Forum Theater: A Teaching Tool for Creating Appropriate Responses to the Racist Patient

Purpose

One of the most important and concerning issues in medicine today is the prevalence of race-based bias directed towards members of the physician workforce. Unfortunately, there have been a number of instances during which healthcare professionals are confronted with explicit bias from patients. The prevalence of bias creates hostile environments for healthcare professionals, thus impacting medical education and patient care.

Method

Multiple educational activities employing a modified version of Augusto Boal's Theater of the Oppressed (TO) were held within the University of Rochester Medical Center. Each session covered laws, policies, and guidelines related to anti-discrimination and bias and challenged different cohorts to create and practice alternative ways to address patients who express explicit bias.

Results

Feedback from participants in the seminars was generally positive. However, the degree of positivity differed based on the participating cohort. Emergency Medicine residents were most critical of the seminars, expressing concerns about the efficacy of the methodology in the ED. Other participants from different medical specialties provided much more positive evaluations.

Conclusion

TO is indeed a methodology that can be employed within the medical profession to teach appropriate responses to expressed patient bias while maintaining the therapeutic relationship. While all medical specialties will not extract the same benefits from use of TO, the positive reception from participants in our preliminary workshops on anti-discrimination and bias establishes a strong foundation for future improvements to this work.

Kong, Daniel

Preceptor

Marc Schemerhorn, MD

Beth Israel Deaconess Medical Center

Department of Vascular and Endovascular Surgery

Co-Authors

Patric Liang, Jeremy Darling, Vaishnavi Lakshminarasimha Rao, Marc Schermerhorn

Comparing Results for Secondary Endovascular versus Open Surgical Intervention after Unsuccessful Bypass Graft in Patients with Lower Extremity Chronic Limb-Threatening Ischemia

Chronic Limb-Threatening Ischemia (CLTI) is characterized by poor perfusion to the limbs where blood cannot match the metabolic demands of the limb due to the narrowing artery. It is estimated that 1-2% of patients with peripheral arterial disease (PAD) develop CLTI who are 50 years or older. CLTI signifies the end stage of PAD which requires prompt and appropriate intervention to avoid limb amputation.

We aimed to compare the clinical outcomes between a secondary endovascular reintervention and open surgical procedure after an initial open bypass graft from January 2005 to October 2014 at Beth Israel Deaconess Medical Center (BIDMC). Of the 2869 total lower extremity revascularizations performed between 2005 and 2014, there were 1336 that fit our criteria of a first-time lower extremity intervention for CLTI. Of the 1336, 668 were bypass procedures and 668 were endovascular procedures. Of the 668 bypass procedures, 186 needed a secondary intervention. 94 were an endovascular repair and 92 were open repairs. Endovascular procedures included PTA, PTA/Stent, drug-coated balloon, drug-eluting stents, and mechanical thrombectomy. Open procedures included jump graft repair, patch repair, thrombectomy, and bypass graft at a different site.

Endovascular reintervention patients, as compared to open repair patients, had a significantly higher BMI (29.0 vs 26.8; $p < 0.03$). However, all demographics and major risk factors were not significantly different between the two groups including TASC classifications. On freedom from amputation analysis, endovascular procedures had a significantly higher 5-year freedom from major amputation after adjusting for baseline characteristics (hazard ratio, 3.0; 95% confidence interval, 1.6-6.5). Major amputation was defined as above and below the knee amputations. Toe and transmetatarsal amputations did not count as a major amputation. Furthermore, the survival analysis did not show a significant 5-year survival between the two comparison groups. Furthermore, survival analysis showed no significant difference between endovascular and open reintervention (hazard ratio, 0.79; 95% confidence interval 0.49-1.3).

Kothari, Shiva

Preceptors

Christopher Mooney, PhD, MPH

Thomas Carroll, MD, PhD

University of Rochester School of Medicine and Dentistry

Department of Mastering Medical Information (MMI) Curriculum

**First Year Medical School Curriculum Work for a Statistics-Based Course:
A Suggested Increase in Course Hours Dedicated to Case Control and
Cohort Study Designs**

Mastering Medical Information (MMI) is a first-year medical course at the University of Rochester School of Medicine (URSOM) focused on statistics, epidemiology, population health and social determinants of health. My role was to augment the pedagogical methods by creating a Problem Based Learning (PBL) Case.

My goals for this summer curriculum were two-fold: to assess the learning objectives (LOs) generated by the first-year medical students (MS) during the traditional portion of the PBL case in a qualitative way by comparing them to the second year MS LOs, and to quantitatively assess the group research assignment for appropriateness of study design.

The PBL was built around a patient case focusing on the nutrition and obesity in the context of heart disease. The PBL case was piloted and refined using feedback from a group of 18-second year MS. The PBL case concluded with a group research assignment of help synthesize the various study designs covered during the MMI course by asking students to choose the best study design based on three different research questions.

Qualitatively the LOs generated by the first and second year MS were similar in content over both. Quantitatively students who picked the study design for RCT research question chose the appropriate study (17/17) while students who picked either the case-control or cohort study design question chose incorrectly (5/19). The stark discrepancy when the data illuminates the variable applicability of case control and cohort study designs and suggests that future course curriculum could focus more on those topics.

Lawton, David

Preceptors

Brian Giordano, MD

Raymond Kenney, MD

University of Rochester Medical Center

Department of Orthopaedics

Co-Authors

Douglas Zaruta, MD

Joseph Schaffer, MD

Dan Kleehammer, PA

Molly McCann, MS

Kelly Adler, MED ATC

University of Rochester Medical Center

Department of Orthopaedics

Surgeons' Accuracy of Predicting Patient-Reported Outcome and Satisfaction Scores in Patients Undergoing Hip Arthroscopy

OBJECTIVES: Excellence in surgical judgment is a highly sought skill developed over one's career which not only guides decision-making but is also thought to be an integral part of becoming a competent surgeon. Surgeons use heuristics on conscious and subconscious levels in everyday practice to predict which patients they believe may have the best surgical outcomes¹. It is unclear if this "gut feeling" is actually predictive of patient outcomes². Comparing a surgeon's preoperative prediction of patient-reported outcomes (PRO) data would provide valuable insight into the accuracy of a surgeon's judgment and may also lead to improved patient care². Identifying differences in accuracy by surgeon level of training (i.e. novice vs expert) would also be helpful to elucidate the effect of clinical experience on surgeon judgement¹. The Patient-Reported Outcomes Information System (PROMIS) tool was developed by the NIH to provide efficient, precise, and valid PRO data that can be used to track changes in physical, mental, and social health³. In patients undergoing hip arthroscopy for femoroacetabular impingement (FAI), PROMIS scores have been previously validated against legacy outcome measures including the modified Harris Hip Score (mHHS), non-arthritic hip score (NAHS), hip osteoarthritis outcome score (HOOS), and visual analog scale (VAS) pain scores³. The purpose of this study was to 1) determine if surgeons can accurately predict patient-reported outcomes after hip arthroscopy and 2) assess if accuracy of surgeon prediction differs with level of training.

METHODS: An ongoing, longitudinal cohort of patients undergoing elective arthroscopic hip surgery at a single academic medical center from November 2017 to August 2018 were enrolled

into the study. Eligible patients completed a series of outcome questionnaires (mHHS, NAHS, and PROMIS) at preoperative and postoperative intervals (2 weeks, 6 weeks, 6 months). A pre-operative questionnaire, designed to predict PRO scores for each patient undergoing arthroscopy was constructed and completed by surgeons, varying by level of training (expert vs. novice). Descriptive statistics were conducted to characterize study sample, and Pearson's correlations were used to compare surgeon and patient outcomes. Regression analyses were also conducted to assess the relationship between surgeon predictions and PRO scores across study time points and by level of training.

RESULTS: A total of 98 patients were enrolled during the study time frame, the majority being female (66.3%). The average age of study participants was 36.3 years (range 18.2 to 66.5 years). PRO measures were obtained from 98 patients at their preoperative visit, 83 during their first postoperative follow up, 69 at 6 weeks and 44 at 6 months postoperatively. PROs differed significantly from preoperative scores at 6 months (p -values <0.0001). Surgical predictions indicated moderate correlation ($r=0.3$ - 0.4) with all PROs at the varying time points. At 6 months postoperatively, expert and novice surgical predictions significantly predicted select PROs (Table 1).

CONCLUSIONS: Patients undergoing hip arthroscopy for FAI had significant improvements in patient-reported outcomes by 6 months postoperatively, which is consistent with prior literature⁴. Surgeon predictions significantly predicted PROs but these did not likely reach clinically meaningful changes at the 6-month time point. With ongoing enrollment and longer follow-up these may reach clinical significance and provide insight for future studies.

Table 1. Patient Reported Outcomes by Level of Training

	Expert		Novice	
	<u>Estimate*</u>	<u>p-value*</u>	<u>Estimate</u>	<u>p-value</u>
Post-Op Visit #3 (n=44)				
NAHS	$r=0.32$	0.04	$r=0.40$	0.01
	$\beta=0.06$	0.03	$\beta=0.01$	0.01
mHHS	$r=0.27$	0.07	$r=0.38$	0.02
	$\beta=0.06$	0.07	$\beta=0.1$	0.01
Depression Score	$r=-0.24$	0.1	$r=-0.36$	0.03
	$\beta=-0.03$	0.1	$\beta=-0.07$	0.03
Pain Interference Score	$r=-0.22$	0.2	$r=-0.38$	0.02
	$\beta=-0.03$	0.2	$\beta=-0.06$	0.02
Physical Function Score	$r=0.41$	0.007	$r=0.42$	0.007
	$\beta=0.05$	0.007	$\beta=0.07$	0.007

* Estimates correspond to Pearson's correlation coefficient (r) and Regression parameter estimates (β)

* p value <0.05 designates statistical significance

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Lee, Gayin

Preceptor

Hye Jin Chung, MD, MMS

Boston University School of Medicine

Department of Dermatology

Co-Author

Ali Al-Hasseni, MD

Folliculotropic Mycosis Fungoides Mimicking Alopecia Areata and Lichen Planopilaris

Folliculotropic mycosis fungoides (FMF) has been classified separately from classic mycosis fungoides (MF) by the World Health Organization/European Organization of Research and Treatment of Cancer since 2005 due to its distinctive clinical and histological features.¹ Multiple studies have also shown that FMF is more resistant to standard treatments and has a worse prognosis compared to classic MF²⁻⁴, which further highlights the importance of properly diagnosing the disease in its early stages. Unfortunately, the diagnosis of FMF can be particularly challenging and is often delayed given its broad clinical and histopathological spectrum, further hindering patient care.² We report a 56 year old patient who was misdiagnosed with alopecia areata (AA) and lichen planopilaris (LPP) before she was properly diagnosed with FMF more than 10 years after her symptoms first manifested. This case highlights the importance of acknowledging the wide spectrum of clinical and histologic manifestations and differential diagnoses of FMF in order to evaluate the true nature of it. A predominant clinical or histopathological finding could mislead the physician into misdiagnosing the disease as seen in this case. Given that LPP, AA and FMF share predominantly lymphocytic processes, histologic distinction could be difficult in some cases. Although the patient presented with some AA-like clinical features and another pattern that was consistent with LPP histologically, the clinicopathologic disconnect prompted us to question the initial diagnoses and ultimately come to the right conclusion.

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Liu, Michelle

Preceptor
Beau Abar, PhD
University of Rochester Medical Center
Department of Emergency Medicine

Co-Authors
Flavia Nobay, MD
David Adler, MD, MPH
University of Rochester
Department of Emergency Medicine

Academic and Professional Outcomes of Participants in an Emergency Department Research Associate Program

Background: Acceptance to post-graduate programs is challenging. Studies have found that participation in specific extracurricular activities, such as emergency department research associate (EDRA) programs, is associated with medical school acceptance. However, little is known about the impact of EDRA program participation to other educational and professional outcomes. We sought to characterize the academic and professional outcomes of participants of an EDRA program and their perception of program influence on career goals and utility to post-graduate program and job applications.

Methods: We conducted a cross-sectional study of graduates of the University of Rochester (UR) EDRA program who graduated from the program between May 2010 and May 2017. EDRAs were recruited by email and/or phone call to fill out a secure, de-identified, online survey. Standard descriptive statistics were used to characterize participant demographics, extracurricular activities, and academic and professional outcomes. National acceptance rates were referenced from online sources.

Results: A total of 88 EDRA program graduates were surveyed with 56 consenting and completing the survey (64% response rate). Forty (71%) identified as female and 17 (30%) identified as non-White, and 3 (5%) identified as Hispanic or Latino. Of 51 respondents, 20 (39%), 4 (8%), 5 (10%), and 3 (6%) are pursuing or have completed MD, DO, physician assistant, and nursing degrees, respectively, after graduating. Four (8%) respondents have occupations in clinical research. Acceptance rates to MD programs, DO programs, PhD programs, and Master programs were 88% (22/25), 92% (12/13), 100% (2/2), and 100% (9/9), respectively. Nationally, acceptance rates are 41%, 34%, 33%, and 42% to MD, DO, physician assistant, and Master and PhD programs, respectively.¹⁻⁴ Eighty-three percent (30/36 responses) spoke about the EDRA

program during post-graduate program interviews, 78% (35/45 responses) included the EDRA program in their personal statement to post-graduate programs, and 74% (37/50 responses) spoke about the EDRA program during job interviews. Of 55 respondents, 18 (33%) changed their career goals after participating in the EDRA program. Nine (50%) of these 18 respondents switched their goals from medicine to a different career and 5 (27%) switched their goals to medicine.

Discussion: Many EDRA graduates pursued medicine and related careers and the majority of EDRA graduates used their EDRA program experiences directly in their post-graduate program applications or interviews and job interviews. Acceptance rates of EDRA program graduates to post-graduate programs were higher than national averages. Some EDRA graduates changed their career goals after program participation.

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Mathews, Eric

Preceptor
Ahmed Ghazi, MD
University of Rochester Medical Center
Department of Urology

Creation of a realistic surgical simulation model to improve preservation of sexual function following robotic prostatectomies

Rationale

Nerve sparing during Robot Assisted Radical Prostatectomy (RARP) is a technically demanding portion of the robotic surgery. Research indicates that as many as a quarter of men undergoing nerve-sparing radical prostatectomies may experience nerve damage preventing the recovery of satisfactory erectile function.

Limited training simulations currently exist for providing realistic practice of robotic surgery, raising concerns for patient safety and outcomes. Amid increasing complexity of surgical procedures, and the ethics surrounding practicing surgery on human beings, simulation provides a safe environment for developing clinical competence without jeopardizing patient safety.

Objectives

The University of Rochester Department of Urology, Simulation Innovation Laboratory (SIL) sought to create a realistic, bleeding partial task trainer to practice the essential components of nerve sparing prostatectomy.

Methods

The physical models are fabricated using a hydrogel polymer that is injected in a mold designed from patient imaging (MRI). This technique allows for the incorporation of sensors that are capable of measuring tension and stretch as well as quantifying the amount of nerve tissue preserved.

Results

The model replicates traction forces and transections of neurovascular bundles that may occur during RARP surgeries, making it one of the few realistic models that provide real-time feedback to trainees—particularly focused on an element of RARP cases for which realism has been found to be lacking in previous simulations, and for which there is potential for improving surgical outcomes and quality of life of patients.

Conclusions

The model will be used to validate a modality for surgery simulation for a high fidelity, partial task nerve sparing prostatectomy. The emphasis on nerve sparing technique recognizes the preservation of sexual function as necessary for maintaining a high quality of life.

Maxwell, Nick

Preceptors

Courtney Jones, PhD, MPH

University of Rochester Medical Center

Department of Emergency Medicine

Implementation of Bleeding Control Basics Training in SE Nigeria

Objectives:

The aim of this study is to evaluate the extent to which a short classroom-based Bleeding Control Basics Course can increase the knowledge of hemorrhage control among Nigerian residents in the prehospital setting. We further aimed to assess various learner sub-groups, to determine which groups, if any, had overall higher performance or greater knowledge growth. The results of this will help us improve the course delivery and identify groups that may benefit most from this training.

Methods:

A Bleeding Control Basics course was taught in SE Nigeria to medical and non-medical staff at a clinic as well as to a class of internal medicine residents at a teaching hospital. A survey was distributed to all course participants immediately before the course began. The survey collected data on key demographic characteristics including level of education, previous medical training, and whether or not they have attempted to provide emergency medical treatment in the prehospital setting in the past. The survey also included 10 knowledge-based questions about hemorrhage control. The same 10 knowledge questions were administered at the conclusion of the course. Characteristics of learners were quantified using descriptive statistics and differences in pre and post-test scores. These were then compared among the entire sample and stratified according to learner subgroups (physician vs. non-physician).

Results:

There were 94 participants with complete data on both the pre- and post-test survey. Forty-three participants were physicians. Over half (56.4%) of the participants had previously attempted to provide emergency medical care in the prehospital setting, including 32 participants who had previous medical training and 21 without prior medical training. There were eight individual knowledge questions that were found to have statistically significant improvement between the pre-test and post-test assessments ($p < 0.05$). There was also a statistically significant increase ($p < 0.0001$) in overall knowledge scores after completion of the course. The pre-test mean was 4.65 (SD: 2.08) compared to a post-test mean was 7.87 (SD: 2.25). Further, both physician and non-physician subgroups increased their overall knowledge scores after completion of the

course ($p < 0.05$). However, the magnitude of the increase in knowledge scores was larger for non-physicians compared to physicians (4.02 vs. 2.49, respectively).

Conclusions:

A large number of participants in our program had previously attempted to provide emergency medical care in the prehospital setting. Our course significantly improved knowledge of bleeding control basics among both physicians and non-physician learners. Thus, the brief classroom-based Bleeding Control Basics course is beneficial to offer in Nigeria due to the prevalence of emergencies in the prehospital setting as well as the lack of knowledge about bleeding control basics.

Mei, Tiffany

Preceptor

Anne Thorndike, MD, MPH

University of Rochester Medical Center

Department of General Medicine

The Relationship of Numeracy and Health Literacy with Obesity and Nutrition Knowledge in a Cohort of Hospital Employees

Numeracy is the understanding of basic probability and numerical concepts as used in everyday life. Health literacy is the capacity to identify, process, and understand the basic health information required to make appropriate health decisions. Both numeracy and health literacy are associated with ability to read and understand nutrition labels. Low numeracy is associated with lower-quality food choices and poor health outcomes, and these differences in diet quality are major contributors to obesity, particularly by race/ethnicity, level of education, and socioeconomic status. The objective of this secondary analysis is to examine the relationships of numeracy and health literacy with overweight and obesity.

Massachusetts General Hospital (MGH) is a teaching hospital in Boston, MA with over 2600 employees. 602 employees are enrolled in the ChooseWell365 randomized control trial which provides automated, personalized nutrition feedback based on employees' purchases at MGH cafeterias. This is a secondary analysis of the 283 Choosewell365 participants who completed their 1-year follow-up visits as of July 20, 2018. Numeracy and health literacy skills were measured using validated tasks at these 1-year appointments. Demographics, BMI, and self-reported nutrition knowledge were also taken from baseline visit surveys.

Employees with lower numeracy and healthy literacy are more likely to be obese. These employees are also more likely to self-report as being somewhat knowledgeable or less knowledgeable about nutrition. Differences in race/ethnicity and education are associated with numeracy and health literacy scores, while age is not. Gender differences are not associated with health literacy, while numeracy scores varied by gender.

This secondary analysis has a few limitations: the workplace sample of MGH employees does not necessarily reflect the general population; the overall sample is highly literate, and the analysis looked at degrees of "adequate literacy"; and univariate analysis does not account for the potential confounding by other factors, and thus requires further analysis.

Numeracy and health literacy may be mediators in obesity. Current presentation of nutrition information may limit understanding and disproportionately affect those with lower numeracy

and health literacy. These factors can be addressed to increase healthy food choices, prevent weight gain, and improve health outcomes related to obesity. Modifying food labeling may increase accessibility to nutritional labels and serve as a cost-effective intervention to circumvent low numeracy and health literacy.

Meng, Steven

Preceptors

Peiyuan Qiu

West China School Of Public Health, Sichuan University

Chengdu, China

Eric Caine, MD

University of Rochester Medical Center

Department of Psychiatry

Co-Authors

Fan Tian

He Wang

West China School of Public Health, Sichuan Univeristy

Chengdu, China

Yeates Conwell, MD

University of Rochester Medical Center

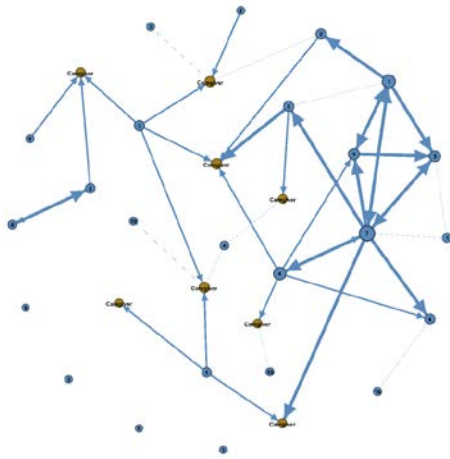
Department of Psychiatry

Effects of Social Network Strength on Mental Health in Urban Elder Care Facilities in Chengdu, China

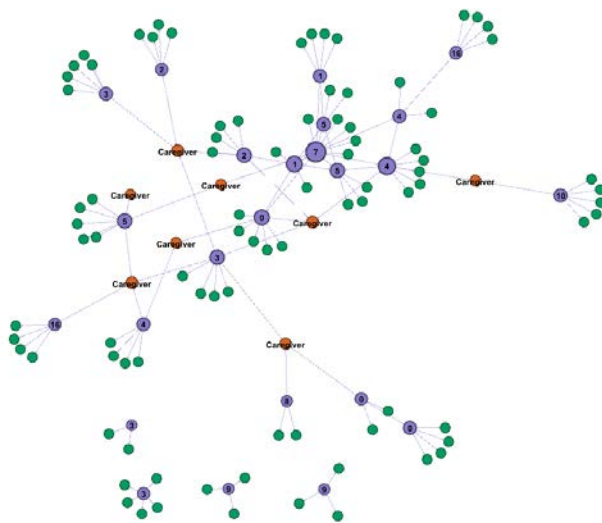
Over the past few decades, Chengdu has undergone accelerated urbanization, expanding its city borders and transforming surrounding rural areas. Elders living in these areas have been particularly affected by cultural changes accompanying these economic and infrastructural transformations. The “4-2-1” family structure from China’s previous One Child Policy has also made it harder for families to take care of these elders. As a result, increasing numbers of elders have moved into nursing homes.

Up to this point, there were limited numbers of studies exploring the mental health of residents in nursing homes in relation to the social connectedness of residents. This pilot study serves to [a] map the social network of elders in Jingyi Endowment Center for Assistive Living, [b] assess the connectedness for participants using Social Network Analysis, and [c] explore its correlation to their mental health, using PHQ-9 as a proxy for depression. Two network maps were constructed – (1) closed network of residents and caregivers only, and (2) open network of residents, caregivers, and relatives. The Social Network Analysis included degree centrality and betweenness centrality. PHQ-9 results were stratified into none, mild, moderate, moderately-severe, and severe depression. We collected data for 24 participants and 8 staff members.

The results of our pilot study showed that in both closed and open network maps, degree centrality and betweenness centrality were inversely associated with the severity of depression. However, these findings were statistically insignificant due to the low number of data points from the small nursing home. Future studies in nursing homes with more residents and also across multiple nursing homes should be conducted to assess the significance of these findings.



Closed network map (Residents, Caregivers) of Jingyi Endowment Center Residents



Open network map (Residents, Caregivers, and Relatives) of Jingyi Endowment Center Residents

Mikami, Sage

Preceptors

Laura Dominici, MD, FACS
Brigham and Women's Hospital
Dana Farber Cancer Institute
Boston, MA

Jan Schriefer, RN, MBA, MSN, DrPH
University of Rochester Medical Center
Department of Pediatric Hospital Medicine

Co-Authors

Kathryn Anderson, PA-C
Tari King, MD FACS
Brigham and Women's Hospital
Dana Farber Cancer Institute
Boston, MA

A Medical Student-Led Quality Improvement Project: Assessment of Opioid Prescription Practices and Patient Use Following Outpatient Breast Surgery**Purpose:**

Across surgical specialties, physicians strive to provide post-operative pain relief for patients. Opioids are widely used to manage acute post-operative pain. For many surgical procedures, there are not clear guidelines regarding appropriate prescriptions for pain relief, which can lead to over-prescription. Post-operative opioid over-prescription is an issue that contributes to the nationwide opioid epidemic. The 2010 National Survey on Drug Use and Health (NSDUH) found that 55% of people were given, 11.4% purchased, and 4.8% took prescription pain relievers from a friend or relative who had a legal prescription. This is compared to 4% who reported obtaining opioid pills from a drug dealer. Although findings vary widely, long-term opioid use is often preceded by treatment of acute pain. Some people who are prescribed opioids progress to developing opioid use disorders. In an effort to minimize the contribution of prescription narcotics to the nationwide opioid epidemic, reductions in post-operative opioid prescribing should be investigated. An internal study conducted at South Shore Hospital in 2016 indicated that prescribing 5 pills of 5mg oxycodone following minimally invasive breast surgeries was sufficient for optimum post-operative pain management. Physicians in our institution were encouraged to practice these guidelines, as well as document patient reported use of opioids prescribed upon follow-up. Our institution aimed to assess the current opioid prescription practices and patient use following minimally invasive outpatient breast surgery with the ultimate goal of reducing the number of unused opioid pills in the community. A baseline data collection was followed by suggestions for improving the quality of the prescribing practices.

Methods:

We conducted a retrospective quality improvement study examining patients with breast cancer stages I-III who underwent Breast Conserving Therapy (BCT) either with or without sentinel lymph node biopsy (SLNB), and who did not receive same day reconstruction, at Brigham and Women's Hospital in Boston, MA from January-July 2017. Clinical records were used to assess the number of ambulatory opioid pills prescribed and the patient-reported number of pills consumed at the time of follow-up. Ambulatory opioid prescriptions included 5mg pills of oxycodone, acetaminophen/hydrocodone, and hydromorphone. Patients who reported unrelated opioid use or who underwent subsequent surgeries prior to the follow up appointment were excluded from the study. This study was exempt by the IRB for internal use. Data was analyzed using Microsoft Excel Version 16.16

Results:

Of the 450 patients who underwent BCT or BCT+ SLNB, 84.2% were prescribed narcotics. Of those who were given prescriptions, only 4.7% used all pills as prescribed, 21.6% used some of the pills, and 61.2% of patients did not use any of the pills prescribed for pain management. In total, 1948 pills were prescribed to patients, yet only 318 (16.3%) of those pills were reportedly consumed, leaving 1630 opioid pills unaccounted for. Patients were prescribed an average of 5.87 pills and consumed an average of 0.96 pills.

Conclusions:

Most patients were prescribed narcotics for post-operative pain relief following outpatient breast surgery; however, the majority of patients did not take any or all of the pills prescribed. Our findings suggest that Quality Improvement strategies can be implemented to better align prescribing practices with patient need. We recommend implementing a Plan Do Study Act cycle where providers reduce prescription from 5 pills to 3-4 pills, as well as fostering educational program for patients, providers and staff on how to safely dispose of unused pills. Furthermore, additional research is warranted to explore other options of post-operative pain management following minimally invasive procedures, such as NSAIDs, in order to minimize the number of unused opioid pills entering the community.

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Motyl, Claire

Preceptors
Long Ngo, PhD
Beth Israel Deaconess Medical Center
Boston, MA

Edward Marcantonio, MD
Harvard Medical School
Boston, MA

Co-Author
Wenxiao Zhou
University of Rochester

Comparative Efficiency of Four Strategies of Delirium Screening

Background: Undiagnosed delirium is common in hospitalized older adults and can lead to poor outcomes. The 3D-CAM is a 3-minute delirium assessment that evaluates four features: acute change/fluctuating course, inattention, disorganized thinking, and altered level of consciousness. If one question assessing a feature is answered incorrectly, that feature is marked present. A two-step delirium detection protocol (Ultra Brief 2-item screener, UB2) was developed from the two 3D-CAM items with the greatest sensitivity and specificity. The specific aim of the present study is to compare the time required to complete a delirium identification protocol under 4 scenarios: 1) administer the full 3D-CAM on all patients, 2) administer the 3D-CAM with a skip pattern on all patients, 3) administer the UB2, followed by the full 3D-CAM in patients who screen 'positive,' and 4) administer the UB2, followed by the 3D-CAM with skip pattern in 'positives.' In the skip pattern, patients who answer one question assessing a feature incorrectly 'skip' the remaining questions assessing that feature. This study simulated the sensitivity, specificity, and completion time under each scenario.

Methods: We combined data from the 3D-CAM: Derivation and Validation of a 3-Minute Diagnostic Interview for CAM-Defined Delirium study (3D-CAM study) and the Researching Efficient Approaches to Delirium Identification (READI) study. Both consented and enrolled older general medicine inpatients. We simulated the average number of 3D-CAM items administered under each scenario from 3D-CAM study data. We calculated median time per item from READI data. We applied the median times to the number of items administered in each assessment pattern to calculate total time for each assessment pattern. We calculated sensitivity and specificity for each assessment pattern. We compared total time for each assessment pattern to

the full 3D-CAM using the Wilcoxon rank-sum test. We completed subset analyses stratified by dementia and delirium status.

Results: Study populations were comparable on age, gender, and race. Sensitivity and specificity for the 3D-CAM and 3D-CAM with skip were 95% and 94%, respectively; for the UB2 + 3D-CAM and UB2 + 3D-CAM with skip they were 93% and 95%. Mean total time for UB2 + 3D-CAM with skip pattern assessment pattern was 1 minute 17s compared to 3 minutes 24s for the 3D-CAM ($p < .001$). For the UB2+ 3D-CAM with skip, stratification results were a total time of 1 minute 3s for patients without delirium or dementia, 1 minute 50s for patients with delirium only, 1 minute 35s for patients with dementia only, and 1 minute 54s for patients with delirium superimposed on dementia.

Conclusion: This study shows that the UB2 + 3D-CAM with skip pattern decreases clinician time required to assess patients for dementia. Future research will be needed to replicate these simulation results in a real patient population. Decreasing time required for delirium assessment holds promise for increasing delirium detection and improving outcomes for patients.

Acknowledgements: Claire Motyl received research funding support from the Medical Student Training in Aging Research Program through NIA Training Grant 5T35AG038027-06.

Najera, Chance

Preceptors

Jessica Goodkind, PhD

University of New Mexico

Department of Sociology

David Adler, MD, MPH

University of Rochester Medical Center

Department of Emergency Medicine

Exploring the Physical Health Status and Attitudes of Refugees: A Mixed Methods Analysis

Introduction: The number of refugees arriving in the United States grows each year as a result of wars raging in other parts of the world. These people are displaced due to religious, ethnic, and political conflict, and experience significant trauma in the process of fleeing to second and third countries of refuge. This trauma can take different forms, including violence, separation from family members, sexual assault, and many others. Additionally, refugees experience significant psychosocial stress while navigating life in countries of resettlement. The pre-migration trauma and post-migration stress associated with resettlement have substantial implications for health, manifesting as mental and physical health difficulties that have been well-documented in the literature exploring refugee well-being.

Methodology: This mixed methods project was performed within the context of a larger study, the Refugee Well-Being Project (RWP). RWP is an NIH-funded study concerned with the impact of socioeconomic factors and community-based interventions on various measures of refugee well-being. RWP involves randomized assignment of refugee families into an intervention or control group, where intervention families are paired with undergraduate students to engage in mutual learning and advocacy, and control group members are offered stress management. Study participants were asked a series of open-ended qualitative questions about their experiences with the resettlement process and adapting to life in the United States, and their responses were coded for thematic content using NVivo 11 software. They were also asked to take computer-based surveys in their native language to assess for a variety of quantitative measures, including but not limited to PTSD symptoms, major depressive symptoms, environmental mastery, access to resources, and social networks. Both the qualitative and quantitative aspects of the data collection were facilitated by interpreters who are members of the respective communities. Data were collected from all participants at 4 time points before, during, and after the 20-week intervention period. Qualitative data were analyzed using the focused coding approach to assess for physical health attitudes and its mediators. Quantitative

data were used in growth curve modeling to assess for variation in physical health-related quality of life (PHRQOL) amongst study participants, and predictors/moderators of this variation.

Results: Qualitative results indicated several important health attitudes and themes: issues related to family have substantial impacts on health, financial and employment concerns cause poor health, poor mental health causes physical health problems, and pre-migration violence has lasting impacts on mental and physical health. In discussing healing and health maintenance, protective factors for health included being resettled to the US, engaging in physical activity, and ability to access healthcare. The proportions of those openly discussing health problems were interesting as well, with the majority of quotes reporting poor health coming from female participants, and primarily from the Iraqi community compared to the Afghan and African communities. Quantitative results indicated statistically significant variation in trajectory of physical health-related quality of life amongst participants. Statistically significant predictors of poorer PHRQOL included higher rates of initial emotional distress, initial difficulty accessing medical care, lower initial perceived English proficiency, and previously experienced trauma. Demographics which were associated with lower PHRQOL included Afghan nationality (compared to both Iraqi nationality and African groups), female gender, single status (compared to married), and older age. Statistically significant time-varying moderators of worse PHRQOL included smaller social support networks, lower environmental mastery.

Conclusions: Exploring the underlying causes of somatic symptoms amongst refugee communities may reveal significant psychological contributions, in addition to primary somatic etiologies. It is important for clinicians to recognize these possibilities, as pharmacotherapy and psychotherapy can significantly improve quality of life for people suffering from PTSD, major depression, and anxiety disorders. Additionally, consideration for socially-focused interventions may be helpful for reducing health disparities in refugee communities.

Acknowledgements: I would like to thank Dr. Deborah Bybee, Dr. Julia Hess, Neil Greene, and Ryeora Choe for their mentorship throughout this project. I would also like to thank the Center for Advocacy, Community Health, Education and Diversity for generously funding this project.

Ng, Grace

Preceptor

Annabelle de St. Maurice, MD, MPH

Ronald Reagan Medical Center at UCLA

Department of Pediatric Infectious Diseases

Project Contributors

Chinmayi Aryasomayajula

David Geffen School of Medicine at UCLA

Los Angeles, CA

Laura Wozniak, MD

Ronald Reagan Medical Center at UCLA

Department of Gastroenterology

Hepatitis A and B Immunity in Pediatric Liver Transplant Recipients**Introduction**

Liver transplantation is a well-established treatment for children with liver failure. However, the immunosuppressive regimen after transplantation increases the risk of infection among vulnerable recipients. In the case of hepatitis A and hepatitis B viruses, exposed patients are also at higher risk for more severe outcomes. Proper and adequate immunization against communicable, vaccine-preventable illnesses remains a public health priority.

Vaccines to prevent hepatitis A and B infection have been routinely administered as part of the immunization schedule for all children since 1991 and 2006, respectively. The hepatitis A vaccine is administered as a 2 dose series with the first dose given between the first and second birthday and the second dose 6-18 months later. Hepatitis B vaccine is given at birth, 1-2 months, and 6-18 months.

While the vaccines have been found to be effective, data show that immunity tends to wane over time, even in healthy individuals. Among adult transplant recipients, studies have found a low frequency of complete vaccination against hepatitis A and B as well as a low seroconversion rate among transplant recipients. Little is known about pediatric transplant recipients' responses to vaccination and whether or not children are able to maintain protective levels after transplantation. The purpose of this study is to examine hepatitis A and B titers in pediatric liver transplant recipients to describe immunity and immune response to vaccination.

Methods

Study population and design

We conducted a retrospective chart review of 344 patient records evaluating hepatitis A and B immunity among pediatric patients who had previously received one or more liver transplants at UCLA from 2000 through 2018.

Data collection

From the 122 patients with hepatitis A or B titers checked after transplant, we collected information on clinical characteristics (levels of immunosuppression, rejection episodes, and lab values related to liver functioning and general health), age at transplant, age at post-transplant testing, and time since transplant. We also obtained dates of vaccination administration from documentation in patient charts as well as from the California Immunization Registry (CAIR).

Hepatitis A and B Titers

Hepatitis A and B titers were based on post-transplant serologic findings. Patients were considered "positive" for Hepatitis A immunity if they had "positive" or "reactive" titers while patients with "negative" or "nonreactive" titers were considered "negative". Patients were considered "positive" for Hepatitis B immunity if they had "positive" titers or hepatitis B surface antibody levels ≥ 10 IU/L while patients with "negative" titers or hepatitis B surface antibody levels < 10 IU/L were considered "negative".

Statistical analyses

We reported p-values for continuous variables and categorical variables using the Wilcoxon rank sum and chi-square tests, respectively. All significance tests were conducted at an $\alpha < 0.05$. Statistical analyses were conducted using Stata statistical software.

Results

Analytic sample

Among 344 pediatric liver transplant recipients reviewed, 122 had been tested for hepatitis A or B titers after transplantation. Seventy-five recipients had both hepatitis A and B titers checked post-transplant. Twenty-one recipients had only hepatitis A titers checked and 26 had only hepatitis B titers checked post-transplant. Among the 122 patients included in analyses, 57 patients (46.7%) were female. One hundred thirteen patients (92.6%) were living and the median age at transplant was 2.40 years. Approximately half of the patients (51.6%) were Hispanic or Latino. The most common indication for liver transplantation was extrahepatic biliary atresia.

Hepatitis A

Among the 96 patients tested for hepatitis A immunity after transplantation, 79 patients (82.3%) had positive titers. In examining patients' pre-transplant titers by post-

transplant titers, of the 6 (17.1%) discordant pairs observed, 3 patients (50%) seroconverted and 3 patients (50%) seroreverted post-transplant. Each patient who seroconverted was vaccinated in between the pretransplant and posttransplant titer check. The difference in number of patients taking Tacrolimus differed significantly ($p=0.002$) between seropositive and seronegative patients, but no statistically significant difference was observed in median level of Tacrolimus. Sixty-five patients received vaccinations for hepatitis A. Of these 54 (56.3%) had positive titers after transplantation.

Hepatitis B

Among the 122 patients tested for hepatitis B immunity after transplantation, 35 patients (34.7%) had positive titers. Fourteen of 49 patients (28.6%) who had pretransplant and posttransplant titers seroreverted after transplantation. Statistically significant differences were found between seropositive and seronegative patients for median age at post-transplant Hepatitis B titer check, median time since transplant, and median level of Tacrolimus. Seventy patients were vaccinated for hepatitis B. Twenty-four of the patients (23.8%) were found to have protective levels of antibodies at the post-transplant testing.

Figures

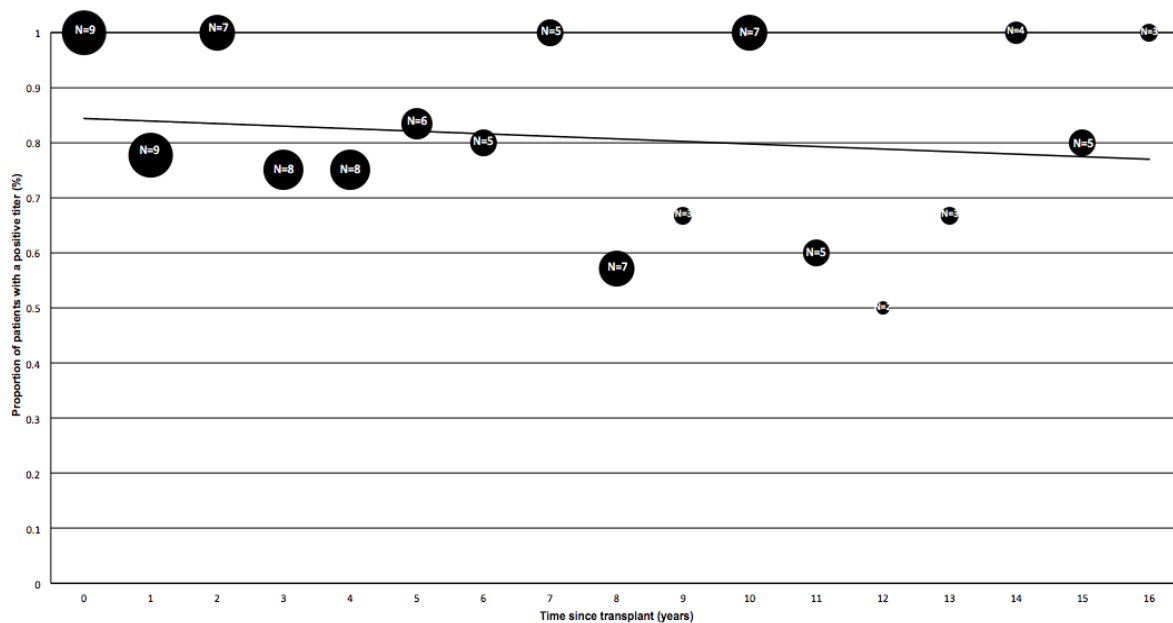


Figure 1. Time since vs. proportion of patients with a positive Hepatitis A (Ab total) titer

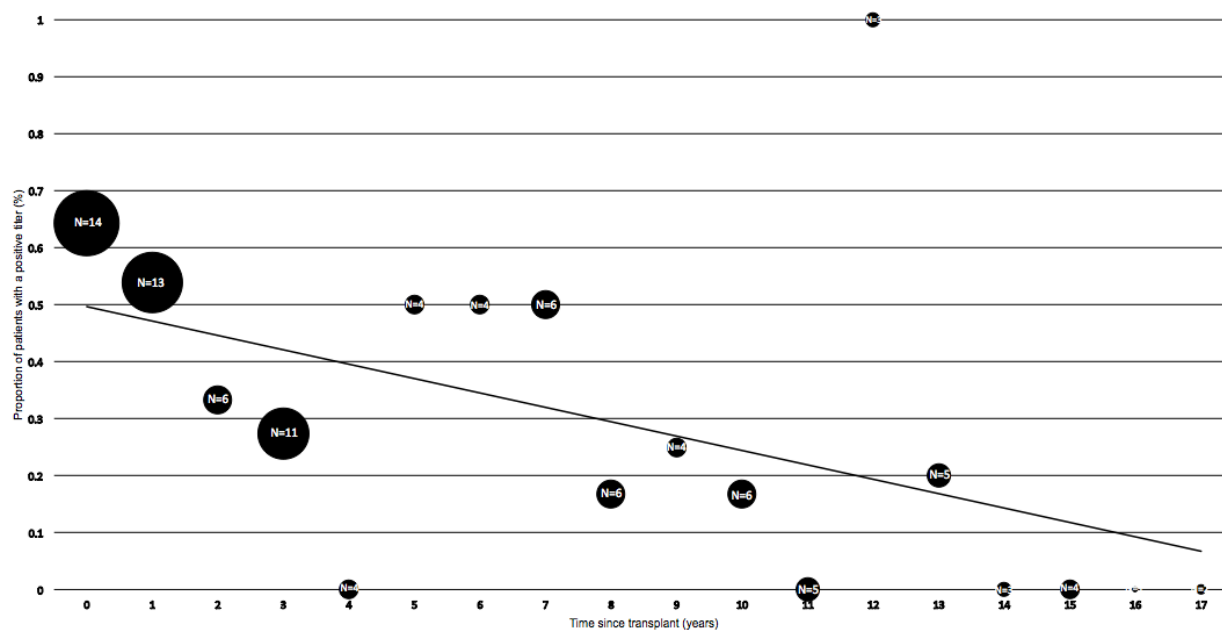


Figure 2. Time since vs. proportion of patients with a positive Hepatitis B (surface Ab) titer

Discussion

Our findings indicate that pediatric liver transplant patients are a vulnerable population with insufficient immunity against hepatitis A and hepatitis B viruses. Liver transplant patients constitute a high risk population and should be vaccinated against hepatitis A and B, but may require individualized immunization schedules. In addition, our findings indicate that pre-transplant titers may not consistently and accurately predict post-transplant titers. Therefore, patients who have undergone transplantation should have their titers checked after transplantation, regardless of pre-transplant immunization. Our findings support those of Leung and colleagues who found low hepatitis B surface antibody immunity among a cohort of pediatric liver transplant patients who had been vaccinated before transplantation. Patients who no longer have protective antibody levels should be given a booster dose and re-checked 3 months after.

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Phan, Amy

Preceptor

Andreas Gomoll, MD

Hospital for Special Surgery

New York, NY

Subchondral Bone Volume Fraction Variation in Osteochondral Allografts

Background/Objective:

Primary Objective: To determine if allograft-coring reamers used to harvest OCAs create variations in bone volume fraction along the circumferential edge.

Secondary Objective: To determine which brand of reamers (JRF, MTF, or Arthrex) creates the largest variation in bone volume fraction along the edges of OCAs.

Background: Symptomatic articular cartilage lesions within young, active populations may be debilitating and predispose the involved joint to premature osteoarthritis. Lesions larger than 2cm² in area with evidence of subchondral bone disease may be treated with osteochondral allograft transplantation. OCA transplantation has a high success rate and is most commonly used to treat femoral condyle lesions with OCA survivorship reported at about 95% at 5 years, 80-85% at 10 years, and 75% at 15 years as shown in previous studies. Failure of OCA transplantation, however, usually involves the subchondral bone rather than primary cartilage collapse. The exact failure mechanism of OCA transplantation is unknown, but possibilities include immunological factors or mechanical failure. It is speculated that the immunological response generated by donor bone marrow cells may compromise integration of the graft, leading to mechanical failure. Allograft coring reamers used in harvesting OCAs may change the bone volume fraction around the circumferential edge. This change in bone volume fraction (BVF) around the circumference can affect the amount of marrow removed during pulse lavage or interfere with bone integration. Bone volume fraction within this study was defined as bone volume divided by total volume of the OCA.

Method: Osteochondral samples were harvested using three different brands of coring reamers: JRF, MTF, or Arthrex. The OCAs were prepared similarly to those used clinically with dimensions of 18mm in diameter and 8mm in length of the subchondral bone. Each OCA was then pulse lavaged at the base and along the circumference for a total of 60 seconds to remove bone marrow elements. Micro-CT was then used to scan each OCA at a resolution of 10 microns. We evaluated the bone volume fraction of the 0.5mm circumferential edge of the OCA in comparison to the cylindrical center that was 17mm. in diameter.

Result: JRF brand reamers created the largest increase in bone volume fraction with a mean difference of 0.173 when comparing the BVF of the circumferential edge to the cylindrical center. Interestingly, MTF brand reamers created, on average, OCAs with a slight decrease (-0.015) in BVF when comparing the circumferential edge to the centers of the OCAs. A Wilcoxon signed rank test, however, found that there was no statistically significant difference in bone volume fraction between OCA edges and centers for any of the different brands.

Conclusion: Change in BVF potentially contributes to OCA failure by affecting bone marrow removal and bone integration of the graft. Within this study, variation was seen in bone volume fraction of OCAs caused by reamers with the greatest variation seen with JRF brand reamers followed by Arthrex and then MTF, but these results did not reach statistical significance. Limitations of the study included a small sample size as only 8 OCA samples were analyzed, and could have contributed to the high p values. Therefore, future directions include continuing the study with remaining OCA samples.

Porter, Randall
Rodriguez, Alejandra

Preceptor
G. Edward Vates, MD, PhD
University of Rochester Medical Center
Department of Neurosurgery

Co-Authors
Zoë Williams, MD
David Paul, MD
Ben Chernoff
University of Rochester Medical Center
Department of Neurosurgery

Optimizing Acquisition Parameters for Diffusion MRI of the Optic Tract

A common complication of pituitary adenomas is demyelination of the optic nerves due to enlargement of the pituitary gland and compression of the optic nerves. After surgical resection of the adenoma, some patients make partial or full recovery of their visual loss due to optic nerve remyelination, yet current methods are insufficient to predict postoperative outcomes. While some studies have attempted to quantify nerve myelination using diffusion MRI modalities such as diffusion tensor imaging (DTI) toward better predictive value of these tests,¹ this provides only crude spatial resolution and fails to resolve crossing fiber orientations, especially given the special challenges involved in diffusion imaging of the optic nerves. Through extensive literature review of the various emergent modalities of both image acquisition and analysis, we have constructed a multi-shell high angular resolution diffusion imaging (HARDI) protocol with subsequent constrained spherical deconvolution (CSD) analysis which significantly increases spatial and angular resolution to resolve fiber crossings even at low crossing angles such as those found in Meyer's loop of the optic radiations. This increased resolution allows for precise tractography which is untenable using DTI; and by resolving fiber crossings, greatly reduces errors in measurements of white matter myelination. Future research would investigate the predictive value of white matter demyelination in pituitary adenomas on postoperative outcomes for these patients. We are hopeful that in conjunction with measures of serum hormone levels, and data from optical coherence tomography, cortical thickness, and functional MRI studies we can gain insight into the pathophysiology of the demyelinating and remyelinating processes which occur in these pituitary adenoma patients and allow for a reliable prognostic protocol which would be of use to clinicians.

¹ D. A. Paul *et al.*, White matter changes linked to visual recovery after nerve decompression. *Sci Transl Med* **6**, 266ra173 (2014).

Prong, Michelle

Preceptor

Ben DiGiovanni, MD, FAOA

University of Rochester Medical Center

Department of Orthopaedics

Co-Authors

Gregg Nicandri, MD

John Gorczyca, MD

University of Rochester Medical Center

Department of Orthopaedics

Orthopaedic Surgery Skills Acquisition: Where, How, and From Whom Residents Are Learning

Introduction: Orthopaedic surgery residency programs have, historically, relied upon an apprenticeship model in order to teach residents essential surgical and non-surgical skills. There are certainly merits to this model, as it has produced a vast number of highly qualified, skilled surgeons. However, recent changes to resident education instituted by the ACGME and the ABOS reflect a heightened concern for patient safety and competency-based training through the concept of “milestones”. Milestones include skills, both surgical and non-surgical, that should be acquired through residency training. In addition to creating explicit milestones to gauge skill acquisition, the ACGME and ABOS have also added a basic surgical skills curriculum to the requirements for accreditation as an orthopaedic surgery residency program. Each individual residency program is responsible for constructing the pedagogical structure of the basic surgical skills curriculum at their institution, but must include instruction in specific topics selected by an expert panel.

In response to the amended ACGME requirements, the University of Rochester Orthopaedics Residency Program has created its basic surgical skills curriculum as an intensive, four-week experience called the “Ortho Intern Boot Camp”. The Boot Camp curriculum includes instruction in basic surgical and non-surgical milestone skills by attending physicians in the Department of Orthopaedics and Rehabilitation. Since the Boot Camp model started in 2015 at the University of Rochester, three classes of orthopaedics residents have participated in the curriculum (PGY-1, PGY-2, and PGY-3 residents in the 2017-2018 academic year), while the PGY-4 and PGY-5 residents in that same academic year did not.

Given that little literature exists about where, when, and from whom orthopaedics residents learn milestones, particularly in the wake of the updated ACGME requirements, it remains unclear as to where residents are being exposed to the skills that end up being important in their future practices. The present study seeks to gain a better understanding of where, how,

and from whom residents are first exposed to milestone skills in the University of Rochester's orthopaedic surgery residency curriculum. This study seeks to compare the cohort of residents who has participated in the Boot Camp (PGY-1, PGY-2, and PGY-3 residents) with the cohort who has not (PGY-4 and PGY-5 residents) with respect to the settings in which residents are first exposed to milestone skills.

We hypothesized that the Boot Camp cohort will report having been exposed to milestone skills during the Boot Camp more commonly than in other settings. In addition, we hypothesized that the Boot Camp cohort will report being exposed to milestone skills in different settings than the cohort that did not participate in the Boot Camp (henceforth referred to as the "control cohort"). These hypotheses are driven by the prevailing conjecture that the Boot Camp is shifting the settings in which residents are first exposed to milestones from higher-stakes settings like the operating room to lower-stakes settings like skills labs.

Methods: In the summer of 2018, 36 orthopaedic surgery residents at the University of Rochester were sent a questionnaire by email asking about where, how, and from whom they are first exposed to the various skills, including those set forth by the ABOS in their report on surgical skills modules for PGY-1 residents. The skills surveyed fit into three categories: surgical skills, non-surgical skills, and skills in the management of certain milestone-based conditions. The survey also asked questions about residents' reactions to the Boot Camp for the Boot Camp cohort and the perceived/hypothetical utility of such a program for the control cohort. The survey was created and distributed through Survey Monkey. IRB approval was obtained through the University of Rochester's Research Subjects Review Board.

Results: Sixteen of the 21 eligible participants (76%) in the Boot Camp cohort (PGY-1, 2, and 3 residents) and 13 of the 14 eligible participants (93%) in the control cohort (PGY-4 and 5 residents) completed the survey. Marked differences between the two groups were evident with respect to the settings in which residents reported first being exposed to knot tying, external fixation, plating, arthroscopy, and chondroplasty, all of which are considered to be surgical milestone skills (Table 1). Residents in the Boot Camp cohort reported first exposure to these surgical skills during the Boot Camp more frequently than in other settings (in the operating room, in the emergency department or hospital floors) and from other sources. The Boot Camp cohort reported first exposure to these surgical skills during the Boot Camp at the following rates: 31% for knot tying, 44% for external fixation, 44% for plating, 63% for arthroscopy, and 44% for chondroplasty. In contrast, residents in the control cohort overwhelmingly reported first exposure to these same surgical skills in the operating room by means of another resident or an attending physician at the following rates: 77% for knot tying, 92% for external fixation, 69% for plating, 77% for arthroscopy, and 92% for chondroplasty.

Table 1: Surgical Skills

	% Boot Camp cohort reporting first exposure in Boot Camp curriculum	% Boot Camp cohort reporting first exposure in OR from another resident or attending	% Control cohort reporting first exposure in OR from another resident or attending
Knot tying	31%	31%	77%
External fixation	44 %	19%	92%
Plating	44 %	25%	69%
Arthroscopy	63%	25%	77%
Chondroplasty	44%	44%	92%

In contrast to several of the surgical skills, there did not seem to be an appreciable difference between the settings in which the two cohorts reported first exposure to the non-surgical skills surveyed (casting, splinting, joint aspiration/injection, placing traction pins, measuring compartment syndrome, reducing joints, reducing fractures, and interpreting diagnostic imaging) (Table 2). Residents in both cohorts most commonly reported the emergency department from a more senior resident as the first setting in which they were exposed to each of these skills, by a wide margin in many cases. Most notably, 100% of the control cohort was first exposed to joint injection/aspiration, placing traction pins, reducing joints, and reducing fractures in the ED or on the hospital floors from another resident. Similarly, the Boot Camp cohort reported first exposure to these same skills in the ED or hospital floors from another resident at the following frequencies: 81% for joint injection/aspiration, 88% for placing traction pins, 88% for reducing joints, and 934% for reducing fractures. Measuring compartment syndrome was the only non-surgical skill for which the trend of first exposure in the Boot Camp cohort deviated markedly from the control cohort, with 31% reporting first exposure in the Boot Camp curriculum and 38% reporting first exposure in the ED or hospital floors, compared with the 69% of the control cohort reporting first exposure in the ED or hospital floors.

Table 2: Non-Surgical Skills

	% Boot Camp cohort reporting first exposure in Boot Camp curriculum	% Boot Camp cohort reporting first exposure in ED/hospital floors from another resident	% Control cohort reporting first exposure in ED/hospital floors from another resident
Casting	6.3%	56%	85%
Splinting	--	75%	92%
Joint aspiration/injection	13%	81%	100%
Placing traction pins	6.3%	88%	100%
Measuring compartment syndrome	31%	38%	69%
Reducing joints	--	88%	100%
Reducing fractures	--	94%	100%
Interpreting diagnostic imaging	--	69%	77%

With respect to the management of milestone-based diagnoses (ankle fracture, diaphyseal tibia or femur fracture, tibial plateau fracture, hip fracture, distal radius fracture, pediatric supracondylar humerus fracture, open fracture, diabetic foot, meniscus tear, and ACL tear), residents in both cohorts, again, most frequently reported the emergency department from another resident as the first setting in which they were exposed to these skills. The two exceptions to this trend were meniscus repair and ACL repair, where residents overwhelmingly reported being first exposed to the management of these two conditions in the operating room from attending surgeons (73% of the Boot Camp group and 69% of the control cohort).

Table 3: Clinical Management Skills

	% Boot Camp cohort reporting first exposure in the ED/hospital floors from another resident or attending	% Control cohort reporting first exposure in the ED/hospital floors from another resident or attending	% Boot Camp cohort reporting first exposure in the OR from another resident or attending	% Control cohort reporting first exposure in the OR from another resident or attending
Ankle fracture	80%	69%	13%	15%
Distal radius fracture	80%	69%	13%	23%
Diabetic foot	80%	69%	6.7%	23%
ACL repair	6.7%	0%	80%	69%
Meniscus repair	6.77%	7.7%	80%	69%

Discussion: In summary, these results demonstrate that residents in the Boot Camp cohort have been exposed to knot tying, external fixation, plating, arthroscopy, chondroplasty, and measuring compartment syndrome in different settings than their more senior colleagues who did not participate in the Boot Camp. Furthermore, these results demonstrate that, even with the advent of the Boot Camp, residents continue to be introduced to non-surgical and diagnosis management skills in the emergency department and on the hospital floors from more senior residents. Finally, these results demonstrate that, regardless of whether residents participated in the Boot Camp or not, exposure to management of meniscus and ACL tears continues to occur in the operating room from attending physicians.

These trends suggest that the Ortho Intern Boot Camp has changed where orthopaedic surgery residents are introduced to many surgical skills in the University of Rochester curriculum. Specifically, these trends suggest that, since instituting the Boot Camp three years ago, residents are more commonly being introduced to surgical skills such as knot tying, external fixation, plating, arthroscopy, chondroplasty, and measuring compartment syndrome in a controlled, low-stakes environment prior to performing these skills in the operating room. This finding seems to fulfill the intention of the mandatory surgical skills curriculum in orthopaedic surgery resident education as set forth by the ACGME and the ABOS. However, while the Boot Camp cohort first being exposed to these surgical skills in the skill lab setting highlights an important shift in residents' education, the operating room and emergency department continue to be important settings for learning as well.

Conclusions:

1. The Boot Camp has shifted the setting of first exposure to many basic surgical skills

from the operating room to the skill lab.

2. The ED and hospital floors remain important settings for introducing residents to many non-surgical and clinical management skills for basic orthopaedic conditions like fractures and diabetic foot.
3. The operating room remains an important setting for introducing residents to the management of more complex orthopaedic conditions like ACL and meniscus tear.
4. Both attending surgeons and senior residents are important teachers for residents as they learn basic surgical, non-surgical, and clinical management skills during their intern year.

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Robinson, Casey

Preceptor

Anthony Pietropaoli, MD, MPH

University of Rochester Medical Center

Department of Medicine, Pulmonary Diseases and Critical Care

Assessing Reactive Hyperemia to Determine Microvasculature Dysfunction in Septic Patients

Context:

Sepsis is a common condition affecting patients admitted to ICUs worldwide. The incidence of sepsis has steadily increased over the past 3 decades and remains the costliest to treat, markedly exceeding that of both chronic heart failure and acute myocardial infarction¹. Identifying prognostic markers that correlate to severity of illness and mortality will help further our understanding of the disease and lead to novel targeted treatments in the future.

Rational:

Sepsis impairs microvascular blood flow by causing endothelium and red blood cell dysfunction. The pathophysiology governing this dysfunction has not been fully determined. Reactive hyperemia is a commonly used noninvasive test to assess microvascular function where by a sphygmomanometer cuff is inflated for five minutes to induce transient ischemia in the forearm^{1,4}. Once released, the blood flow rate is measured and compared to the baseline flow rate to determine microvasculature function (i.e. vasodilation in response to a transient ischemic episode). The underlying mechanisms of this vasodilation include sheer stress leading to endothelial-dependent vasodilation, the myogenic response, and ischemia-induced modulators including the RBC-nitrite-ATP system among others^{2,3}.

The preliminary findings from the Severe Systemic Inflammatory Response Syndrome Cohort Study found septic patients have decreased capacity to convert nitrite to nitric oxide (NO), increased intracellular RBC ATP, and decreased RBC osmotic fragility (indicating excessive RBC rigidity). Each finding suggests a dysfunction in the RBCs of septic patients. Building on the preliminary RBC data from the existing enrollment of over 300 patients, we now seek to determine the relationship between reactive hyperemia, our primary readout for microvascular dysfunction, and RBC dysfunction in septic patients. We hypothesize that post-cuff deflation waveforms occurring within 15s will be decreased in septic vs. healthy controls and the degree of RH decline will correlate with severity of illness and these parameters of RBC dysfunction.

Methodology:

Study Design: Prospective Cohort Study

Research Population: Critically ill patients were screened for organ dysfunction and were recruited across 5 critical care teams at the University of Rochester Medical Center. Age and gender stratified healthy control subjects were recruited from the University of Rochester region at large.

Measures: Archived pulse-wave spectral Doppler images of the brachial artery from 44 healthy subjects and 145 critically ill subjects were analyzed to determine area under the curve for one cardiac cycle, an index for reactive hyperemia, using ImageJ software. The archived images were obtained from subjects who were measured while lying supine with head elevated to approximately 30 degrees, in a quiet, temperature controlled room. Baseline measurements were captured just prior to sphygmomanometer cuff inflation for 5 min. Post-cuff deflation waveforms were captured immediately following cuff-deflation for a total of 3 minutes. Images were saved to a file for later use. The velocity time integral per cardiac cycle (cm/cardiac cycle) was determined for both baseline and 15 seconds post-cuff deflation waveforms. The three largest measurements from each group were averaged and compared to find the difference and % change between baseline and post-cuff measurements. The analysis of this data set is ongoing and results are pending.

Conclusion: The SICC study is ongoing and further analysis of the data is needed to determine relationships between microvascular dysfunction (noninvasively measured with reactive hyperemia), RBC dysfunction, severity of illness, and clinical outcomes in septic patients.

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Sebastian, Armand

Preceptor

John Elefteriades, MD, PhD

Yale School of Medicine

Aortic Institute at Yale-New Haven

Co-Authors

Mahammad Zafar, MBBS

Yupeng Li, PhD

John A Rizzo, PhD

Bulat Ziganshin, MD, PhD

Yale School of Medicine

**Natural History of Thoracic Ascending Aortic Aneurysms in
Patients with a Bovine Aortic Arch**

Background: Bovine arch (BA) refers to a group of congenital variants of the great vessels of the aorta in which the innominate and left common carotid (LCC) arteries either share a common origin or the LCC takes origin from the innominate artery proper. There is a paucity of literature reporting on the clinical implications of BA in patients because it is typically regarded as a “normal” anatomic variant. However, in our previous work, which aimed to elucidate the virulence of BA in patients with thoracic aortic disease (TAD), we estimated the prevalence of BA to be 26.3% in patients with known TAD. Thus, we identified BA as a risk factor for developing thoracic aortic aneurysms and their associated complications such as rupture, dissection, and death. The natural history of BA in patients with thoracic ascending aortic aneurysms (TAAA) has yet to be explored in scientific literature. The purpose of this study is to better define the association between BA and the prevalence and progression of TAAA.

Methods: Our database at the Aortic Institute currently includes a total of 3,506 thoracic aortic aneurysm patients and among those, 780 TAAA patients with a total of 1,272 ascending aortic size measurements and a mean radiologic follow-up of 47.7 months were chosen for the purposes of this study. All radiologic studies were re-read and re-analyzed in a standardized manner. Ascending growth rate estimates, average annual rates of adverse events (rupture, dissection, and death) in 5 groups of aortic sizes, and 5-year event-free survival were determined and assessed. The natural history of TAAA was compared between patients with a BA (BA+) and patients without a BA (BA-). Statistical analysis was performed using R 3.1.0 (R Foundation for Statistical Computing, Vienna, Austria).

Results: The overall prevalence of BA in patients with TAAA was found to be 14.9% (n=116). Ascending aortic growth rate was found to be 0.142cm/year in the BA+ group compared to 0.144cm/year in the BA- group with larger aneurysms demonstrating faster growth rates. Analysis of the estimated probability of risk of rupture and dissection at various aortic sizes revealed that the risk increased sharply at 4.75cm in the BA+ group compared to 5.25cm in the BA- group. In the BA+ group, there was a 25-fold increase in the probability of rupture, dissection or death for patients with an $ASI \geq 4.25$ (OR = 24.93, p = 0.00215) compared to a 5-fold increase in the BA- group (OR = 4.85, p = 0.00134).

Conclusion: This study of the natural history of TAAA in patients with BA permits the following conclusions: (1) there is no significant difference in ascending aortic growth rates between BA+ and BA- patients, (2) the natural risk of rupture and dissection based on aneurysm size increases sharply at an earlier "hinge point" of 4.75cm in BA+ patients compared to 5.25cm in BA- patients, and (3) at $ASI's \geq 4.25$, BA+ patients have a significant increase in the probability of rupture, dissection, or death compared to BA- patients. The evidence is consistent and supports a relationship between BA and increased virulence in patients with TAAA.

Senda, Eugene

Preceptor

Omar Aljitawi, MD

University of Rochester Medical Center

Wilmot Cancer Institute

Effects of Hyperbaric Oxygen on VCAM-1 Expression of Bone Marrow Stromal Cells

Background:

Umbilical cord blood (UCB) provides a source of hematopoietic stem cells (HSCs) that can help cure patients with hematologic conditions, particularly in patients without a HLA-matched donors [1, 2]. However, UCB transplants are limited by cell dose and impairments in the homing of HSCs to the bone marrow [3, 4]. Previous studies in the Aljitawi laboratory showed that HBO therapy to reduce erythropoietin (EPO) in patients with hematologic malignancies after myeloablative or reduced intensity conditioning regimens and prior to UCB transplantation was a safe and effective treatment that led to favorable engraftment rates and kinetics in these patients, compared to historical controls [5]. However, the exact mechanism as to how decreased EPO and HBO treatment lead to increased homing of HSCs into the bone marrow remains unclear. Bone marrow stromal cells have been shown to play a key role in the homing, lodging and engraftment of HSCs into the bone marrow through secretion of chemokines, such as stromal cell-derived factor-1 (SDF-1), which binds to the CXCR4 receptor on HSCs [6-8]. Thus, we hypothesized that HBO treatment affects bone marrow stromal cells in a way that enhances the homing and lodging of HSCs into bone marrow stromal niches.

Methods:

We replicated the experimental conditions of irradiation (270 cGys) followed by HBO treatment (100% oxygen for 2 hours at 2.5 atm) in cultured bone marrow stromal cells from healthy human donors, extracted mRNA from the stromal cells, and performed RNA sequencing (RNAseq) to examine what mRNA transcripts were up- or down-regulated in response to HBO after irradiation. We also performed an enzyme linked immunosorbent assay (ELISA) for soluble VCAM-1 (sVCAM-1) in the culture supernatant of bone marrow stromal cells subjected to irradiation followed by HBO.

Results:

RNAseq results revealed that SDF-1 mRNA levels remained unchanged; however, one exciting result was that vascular cell adhesion molecule 1 (VCAM-1) mRNA levels in bone marrow stromal cells were significantly increased (2.5-fold) in response to HBO after irradiation. Preliminary results of the sVCAM-1 ELISA showed that VCAM-1 is increased in culture supernatant of bone

marrow stromal cells in response to HBO after irradiation, compared to cells subjected to only irradiation.

Discussion:

HBO therapy has been shown to increase homing of HSCs to the bone marrow in patients who have undergone myeloablative therapy or reduced intensity conditioning regimens and umbilical cord blood transplantation. Our RNAseq results show that the significant increase in VCAM-1 mRNA levels in bone marrow stromal cells subjected to HBO conditions may be another mechanism which helps cement HSCs in their bone marrow stromal niche, ultimately leading to increased engraftment and reconstitution of hematopoiesis. VCAM-1 is a cell adhesion molecule expressed on bone marrow endothelial cells that plays a key role in homing of HSCs by binding tightly to Very Late Antigen-4 (VLA-4) on HSCs, leading to firm adhesion of rolling HSCs and subsequent transendothelial migration toward the bone marrow extravascular space [9]. The final anchorage process of HSCs to the bone marrow microenvironment is mediated by the binding of integrins, such as VLA-4, to stromal cell ligands, such as VCAM-1, on stromal cells and has shown to play a key role in HSC homing, lodging, and engraftment [10-12].

Conclusion:

The upregulation of VCAM-1 mRNA in human bone marrow stromal cells in response to HBO is a new discovery that requires further investigation in order to optimize the use of HBO therapy in HSC transplantations and hopefully lead to new therapeutic approaches to improving HSC transplantations and ultimately improving clinical outcomes in patients undergoing HSC transplantation.

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Acknowledgements: I would like to thank Dr. Aljitawi, Tom Conley, and Grace Chiu for all of their support, mentorship, and kindness during my time in the lab. I would also like to thank Dr. Huston and the Robert Weed Research Fellowship in Hematology-Oncology for their generous support and funding for this project.

Sholtis, Connor

Preceptor

Joseph Shrager, MD

Stanford University

Department of Cardiothoracic Surgery

Thymectomy Is the Most Cost-Effective Surgical Approach in Myasthenia Gravis

Objectives: Thymectomy has recently been demonstrated to improve the course of myasthenia gravis (MG). In multiple retrospective studies, the several surgical techniques available to perform extended thymectomy in MG result in overlapping remission rates. Thus, perioperative outcomes and costs associated with the various procedures should dictate the choice of operative approach.

Methods: We compared perioperative outcomes and costs among 3 approaches to thymectomy used at our institution (MS – median sternotomy; VRATS – VATS and/or robotic; TCT – transcervical). Our transcervical approach now employs thoracoscopic visualization as described by the Toronto group. In order to compare like subjects, we excluded patients who underwent a less than extended thymectomy and those with a > 5 cm or invasive tumor. Intention to treat analysis was utilized. Clinical outcomes were collected from a locally enhanced STS database. Hospital costs were collected by finance personnel and sub-categorized. Our institution agreed to provide relative, but not absolute, cost data.

Results: 211 thymic operations were performed 2010-2018. After exclusions, the study group consisted of 25 TCT, 24 VRATS, and 15 MS. There was a higher incidence of MG in the TCT and MS groups ($p < 0.05$) and of thymoma in the VRATS and MS groups ($p < 0.01$). Mean modified Charlson co-morbidity score was higher for MS than TCT and VRATS ($p < 0.01$) but did not differ between TCT and VRATS. There was no significant difference in the rate of perioperative complications between approaches. The cost of TCT was 45% of MS ($p < 0.001$) and 58% of VRATS ($p = 0.018$, Fig. 1). TCT had shorter mean length of stay (1.2 days) than MS (4.3; $p < 0.001$) and VRATS (2.6; $p = 0.02$). Bed cost was the major contributor to cost difference between the 3 groups, accounting for 60% of the cost difference between TCT and MS ($p < 0.001$) and 41% of the difference between TCT and VRATS ($p < 0.001$, Fig. 1).

Conclusions: Transcervical thymectomy, which has been shown to provide overlapping remission rates vs. more invasive approaches, is equally safe and far less costly than MS and VRATS approaches. TCT should therefore be the preferred thymectomy technique in non-thymomatous MG, for surgeons able to access training/experience in TCT.

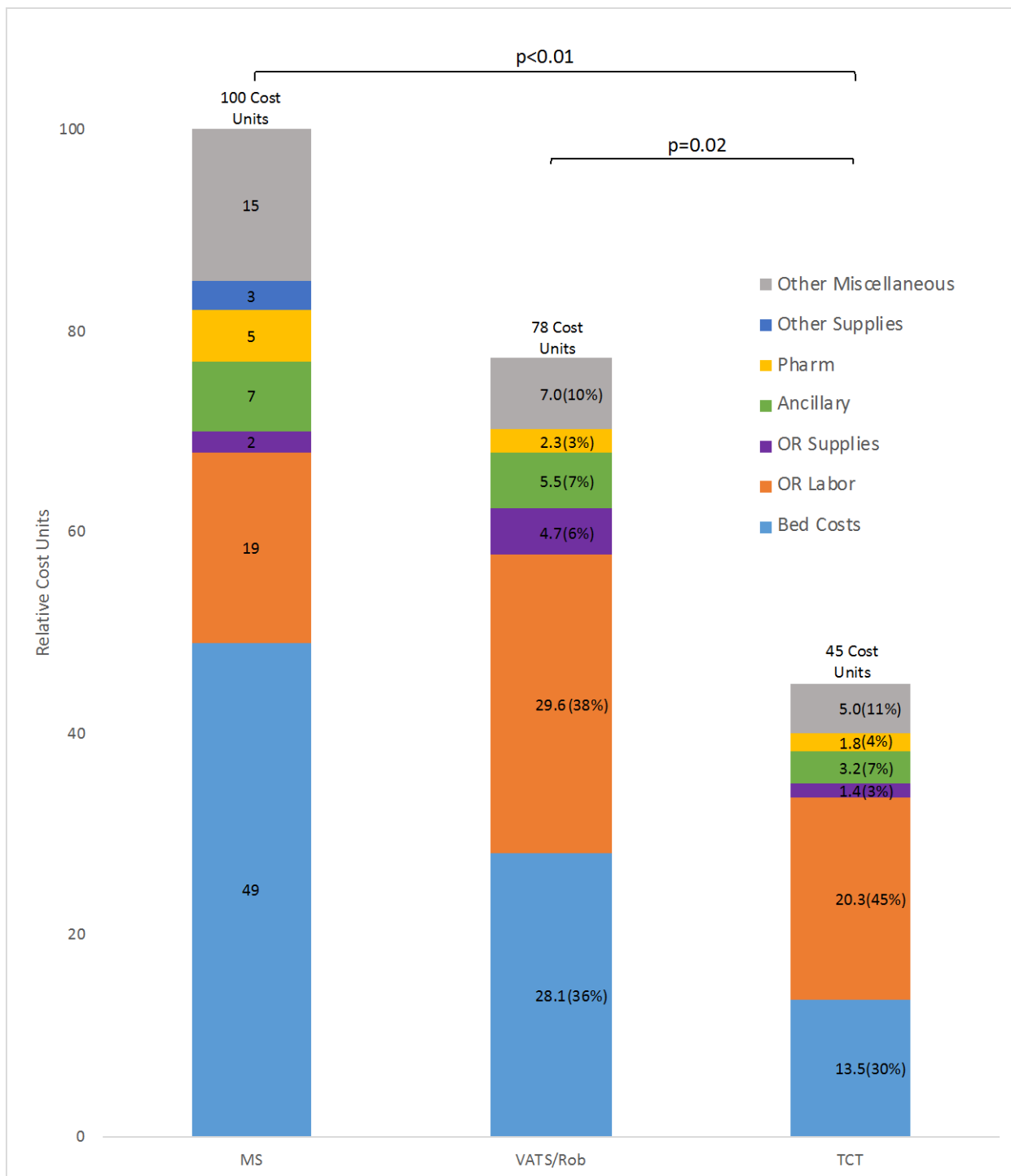


Figure 3. Relative hospital cost associated with thymectomy via median sternotomy (MS), video-assisted thoracoscopic and/or robotic (VRATS), and transcervical (TCT) approaches. The total cost of thymectomy via MS was set at a value of 100. The relative cost of each accounting category is indicated, followed by the percentage that category contributed to total procedural cost for that type of procedure.

Winbush, Angelina

Preceptor

Cynthia Monaco, MD, PhD

University of Rochester Medical Center

Departments of Internal Medicine and Microbiology and Immunology

Co-Authors

Breóna Barr, Alex Grier, Tracy Meiring, Anna-Lise Williamson, Linda Gail-Bekker, and David Adler, MD

Comparison of the Female Reproductive Tract Microbiome with HIV Status in a Sub-Saharan African Cohort

Background: The HIV epidemic places a significant health, social, and economic burden on individuals globally. Currently, 36 million people are infected worldwide, with Sub-Saharan Africa experiencing a disproportionately high prevalence of cases. Around the world, 90% of HIV transmission occurs following heterosexual intercourse where women are twice as likely as men to acquire HIV. Once exposed, HIV enters through mucosal membranes and rapidly targets local CD4⁺ T-cell populations which leads to induction of localized inflammation, and eventually if untreated opportunistic infections and death. To modulate the risk of pathogen acquisition, the female reproductive tract (FRT) is colonized with bacterial species, referred to as the FRT microbiome. The FRT microbiome is known to confer health benefits to the host and influence susceptibility to infection. Alterations to the FRT microbiome such as occur during bacterial vaginosis (BV) pose an elevated risk for sexually transmitted infections (STIs), including HIV and human papillomavirus (HPV) infection. While lactobacillus-dominant FRT microbiomes have been associated with decreased inflammation and infection, high-diversity microbiomes have been associated with increased inflammation, pre-term birth, BV, and a greater infection risk. Differences in microbiome composition can be assessed by utilizing alpha and beta diversity measures with alpha diversity referring to the level of diversity seen within a sample and beta diversity referring to the level of specie difference seen across samples.

Purpose: The purpose of this study was to analyze differences in bacterial composition in the FRT microbiome by HIV status.

Methods: We conducted a retrospective, longitudinal analysis on 310 vaginal swabs from 50 HIV-positive and 50-HIV negative women living in Cape Town, South Africa. Amplification of the 16S rRNA V3-V4 region was performed from extracted total nucleic acid followed by sequencing on the Illumina MiSeq Platform. QIIME2 was utilized for quality control, alpha and beta diversity metrics, and statistical analysis. Duplicate samples, samples with insufficient high-quality reads,

post-seroconversion samples, and single point samples were excluded from longitudinal analyses (n=224).

Results: Of the participants, two tested positive upon enrollment and two seroconverted during the study. Forty-four percent of seropositive participants were on HAART. HIV-positive subjects were more likely to have HPV and high-risk HPV stains compared to controls ($p < 0.0001$ and $p = 0.0017$, respectively). There was no significant difference in abnormal PAP smear or BV diagnosis between the two groups. Microbiome analysis revealed that baseline alpha diversity was higher in HIV-infected subjects not on HAART compared to healthy controls ($p = 0.022$). While there was no significant longitudinal difference in alpha diversity between HIV-positive and HIV-negative groups, alpha diversity of all groups changed significantly overtime from baseline ($p = 0.038$). Beta diversity between consecutive time points significantly decreased in HIV-positive subjects on HAART compared to HIV negative controls by weighted unifracs analysis ($P = 0.003$). Subgroup analysis of HPV-positive participants revealed bacterial alpha diversity differences among those infected with HPV types 6, 35, and 62 ($p = 0.007$, $p = 0.018$, and $p = 0.0326$, respectively). Weighted unifracs analysis of HPV positive subjects revealed a significant difference in beta diversity when HPV type 6 was present. Further, HPV 39 and 70 were positively correlated with *Neisseria* abundance in multivariate analysis, independent of HIV status, ART, read count, sequencing run, age, previous STDs, number of lifetime or recent partners, condom use, and other HPV types.

Conclusion: In conclusion, in this cohort, HIV infection was associated with increased incidence of HPV infection, increase baseline alpha diversity in those not on HAART, as well as a decrease in beta diversity for subjects on HAART compared to HIV-negative controls. In HPV-positive patients, bacterial diversity differed by HPV subtype.

Zhang, Anne

Preceptor
Hannah Lane, PhD
University of Maryland School of Medicine

Co-Authors
Katherine Campbell, MPH
Erin Hager, PhD
University of Maryland School of Medicine

**Development and Testing of an Observational Audit Tool for
School Lunchroom Environments**

The lunchroom environment may play a role in promoting or hindering the consumption of healthy foods. The Smarter Lunchroom Movement aims to help school lunchrooms make easy, cost-effective environmental interventions in the cafeteria to encourage selection and consumption of healthy foods. Evaluations of the effectiveness of Smarter Lunchroom strategies on students' healthy food consumption have produced mixed results, perhaps in part due to the lack of a reliable and objective way to examine cafeteria-level changes. The aim of this study was to develop a clear and objective audit tool that assesses the school lunchroom environment. To develop the tool, contents from the Smarter Lunchroom Scorecard and other school environmental audit tools were adapted and, after pilot testing, revised to ensure objectivity and clarity. The newly developed tool consists of 48 yes/no items and was independently tested by pairs of auditors in 18 elementary or middle schools in two Maryland school systems during the 2017-2018 school year. To evaluate the audit, a scoring system was created that combined individual items into one of the following four categories: atmosphere (10 items), accessibility (12 items), attractiveness (4 items), and advertisement (13 items). The scoring system was used to test for inter-rater reliability using percentage agreement and Cohen's Kappa score. Individual items with poor inter-rater reliability (<66% agreement) were either re-worded for objectivity or removed from the 4-category scoring system. The tool had moderate reliability across the atmosphere, accessibility, and advertisement categories, ($0.61 < \kappa < 0.77$) and weak reliability in the attractiveness category ($\kappa = 0.46$). This study developed an objective audit tool that can reliably examine atmosphere, accessibility, and advertising, in line with Smarter Lunchroom Movement strategies, in school cafeterias. The application of this tool can be used to inform lunchroom policies or interventions to improve eating behaviors and combat pediatric obesity.

Zhao, Yu

Preceptors

Patrycja Dubielecka-Szczerba, PhD

Brown University

Department of Medicine- Hematology and Oncology

Signal Transduction Lab

Omar Aljitawi, MD

University of Rochester Medical Center

Department of Internal Medicine, Hematology/Oncology

The Role of NF-KB Signaling in Malignant Hematopoietic Stem Cells

Introduction. NF-kB is a family of eukaryotic transcription factors that have been implicated in normal and pathological processes. They are implicated in a wide variety of functions, ranging from apoptosis, cell growth, wound healing, immune responses, and development. NF-kB has been associated with pathologies such as cancer, heart disease, asthma, and neurodegenerative disease. NF-KB is crucial for development of the immune system, and specifically, for hematopoietic stem cell (HSC) development and specification. Notch, a well-established mediator of HSC development, can be regulated by the canonical NF-KB pathway for HSC development. Abelson-interactor protein-1 is a negative regulator of non-receptor tyrosine kinase that is important for cellular proliferation. Deficiency of Abi-1 has been shown to induce various pathologies and embryonic lethality. As NF-KB plays an essential role in the hematopoietic system, it is crucial to delineate how it interacts with Abi-1. The objective of this study is to elucidate activation of NF-KB in Abi-1 knockout models.

Materials and Methods. Immunofluorescence staining and subcellular fractionation were performed. 4 mice from Abi-1 WT and Abi-KO models were utilized for immunofluorescence. Bone marrow cells were harvested from mice at 20 weeks. They were stained with the primary antibodies NF-KB p65 anti-rabbit (CST, #8242) at 1:200 dilution and phosphorylated NF-KB p65 anti-rabbit (CST, #3033) at 1:100 dilution for 1 hour at RT. Subcellular protein fractionation was performed for K562 cultured cells, which allowed for the separation of specific extracts in each layer for comparison. Extracted protein lysates were visualized with immunoblotting with markers GAPDH, Histone-3, and integrin beta-1.

Results. Results indicated a significant difference between the staining of Abi-1 KO and WT mice. The Abi-1 KO mice had a much higher number of positive signals, as indicated by the fluorescence in green. Results demonstrated a more significant effect of NF-KB as compared to pNF-KB in the Abi-1 KO mice. Interestingly, most positive signaling was localized to the periphery

of nuclei. Results from subcellular protein fractionation were less conclusive but demonstrated separation of lysate in each layer with some contamination.

Conclusion. Our results indicated differences in the level of expression of NF-KB between Abi-1 deficient and Abi-1 WT mice groups. In conjunction with data from our previous experiments, this strengthens a relationship between Abi-1 knockout and the resulting hyperactivity of the STAT3-SFK-NF-KB signaling pathway. This indicates a greater activation of inflammatory signaling with the loss of this signal, indicating the development of a myeloproliferative neoplasm. These studies could hold implication for the generation of a novel signaling target for the treatment of leukemic malignancies.

Dillen, Jonathan
Johnson, TyLia

Preceptor
Adrienne Morgan, PhD
University of Rochester School of Medicine and Dentistry
CACHED

Co-Authors
Michaela Barry
Kevin Li
University of Rochester

URMC Street Outreach and Project Homeless Connect 2018

Street Outreach is a student-run organization at University of Rochester SMD. Each year medical and nursing students, residents, and practicing physicians work together to serve people struggling with homelessness in Rochester, NY. Hundreds of people are living on the streets, in camps, or in temporary shelters every night in Monroe County. We aim to provide holistic care to people where they are on their terms. This includes providing them with food, basic social services support, basic medical care, and health resources.

We attempted to conduct a formal needs assessment survey at Project Homeless Connect to better understand community needs. Due to the structure of the event we were unable to successfully complete a needs assessment. We decided to have students and other participants of Street Outreach take copies of the needs assessment surveys on street rounds in order to have people in various sites we visit complete it. In doing so, they will be able to better adjust their supply reservoir to be more appropriate for the actual community needs.

We accomplished our goal of actively participating in Project Homeless Connect, organizing and participating in weekly street rounds, and creating a needs assessment survey that can be utilized on future rounds. We had the opportunity to serve over 120 people at PHC and provided many with various supplies and resources. In the future, we will aim to expand this outreach effort more by broadening our variety of supplies, in particular reading glasses, clothing and hygiene products. Also, in order to provide more specific and necessary supplies we would like to complete a needs assessment survey leading up to the event. This will allow us to address the major needs of the community.

Community Health Research

Fennell, Margaret
Jennifer Godbout

Preceptor
Michael Brennan, PhD
School of Nursing

UR Well: A Digital Update and EMR Analysis

UR Well Clinics provide medical care to the uninsured and underinsured members of the Rochester community. The UR Well organization is composed of three student-run clinic locations: St. Joseph's Neighborhood Center (St. Joe's), Asbury First Methodist Church (Asbury), and St. Luke's Tabernacle Community Church (St. Luke's). These weekly evening clinics provide physical exams, acute care, specialty care, lab work and screenings to Rochester's underserved.

Two UR Well summer interns designed projects to help improve UR Well's service to its community. The first project aimed to digitally update organizational and patient resource materials as well as expand upon instructional guides and training produces for St Joe's. The second project sought to analyze Asbury and St. Luke's patient demographics, rates of insurance, primary care access and services provided to better understand UR Well patient populations and identify areas for future development.

Part I: UR Well Digital Update

This arm of the UR Well summer project was threefold: first, the creation of a digital common space for UR Well materials; second, the update of a comprehensive list of neighborhood resources for patients; and third, the development of a complete training guide for the Administrative Coordinators (ACs) at St. Joe's Clinic.

With three independently functioning clinics, organizing the operations of UR Well as one cohesive association can present challenges, especially in regard to the change in leadership that occurs every spring as students graduate. For example, many documents exist that serve as guides for the next rising class of administrators of UR Well, but how these documents and references are passed down has historically been rather informal with students simply emailing the guides out to the incoming students. As UR Well expands as an organization, the UR Well Summer Interns sought to create a common space where all documents, guides, or references could be stored and accessed with ease. The UR Well Google Drive was created, and access was granted to the three Clinic Directors (CDs), as well as the Head Administrative Coordinators (Head ACs). A folder was created for each clinic, in which the CDs and Head ACs placed all existing guides to the functioning of UR Well.

Additionally, a folder for resources was created which contains guides created for patients of all three clinics. Documents such as the "Food Pantry List", and the "Emergency Housing List" are stored in this folder. For the second arm of the overall digital update, the document entitled "Homeless and Hunger Guide" was updated with current information (addresses, phone numbers, hours of operations, scope of services) for patients of the three clinics.

For the third arm of this digital update, a training guide for ACs at St. Joe's Clinic was developed. Several years ago, St. Joe's Clinic switched to the electronic medical record Greenway. Given that ACs only work every two to three weeks, it is difficult to master the complexities of Greenway, as well as the changing policies and procedures of St. Joe's. Thus, with this switch to Greenway a brief Google Doc was created several years ago as a "cheat sheet" for ACs to use during the Tuesday night UR Well Clinic. This brief cheat sheet was updated this summer to a 50-page complete training guide with step-by-step instructions for all processes handled by the front desk staff at St. Joe's and the ACs during UR Well. With this training guide, ACs will have a thorough resource to reference should a situation arise with which they are either not familiar or have too little experience to properly handle. Moreover, this document was created with the St. Joe's daytime clinic staff and volunteers in mind. St. Joe's has many volunteers that serve at the front desk who will now be able to use this document as a guide to helping patients. Additionally, a training checklist was created for the incoming Junior ACs. This checklist will serve as a general guide to all of the processes that the Junior ACs should feel comfortable completing on their own before becoming Senior ACs.

Part II: RedCap Data Analysis

In 2016, RedCAP, an electronic medical record system, was implemented in the Asbury and St. Luke's UR Well clinics to improve patient medical records and to collect survey data. This study analyzed patient data from the implementation of RedCAP in 2016 to July 2018 to better understand the demographics and needs of UR Well patients.

Over the past two years, the average age of Asbury and St. Luke's patients was 32.7 years old with 67.1% of patients being female and 32.8% being male. Patients have traveled to UR Well Clinics from 58 distinct zip codes from as far as Alabama (36066) and Massachusetts (01603). Most UR Well patients are Monroe County residents with patients most commonly from the Greater Rochester Area (Figure 1).

Out of 1,004 responses, 44.1% of UR Well patients did not currently have health insurance (Figure 2). Of UR Well patients without insurance, primary challenges to becoming insured included unemployment (25.0%), no employer-based insurance (13.2%), lack of time to find insurance (12.9%), and difficulty filling out insurance forms (6.8%). 48.6% of uninsured patients responded "Other" in response to the question of their primary challenges to becoming insured indicating that an edited version of this question may better assess the challenges UR Well patients face in becoming insured. Whether they were insured or uninsured, 57.0% of 1,019 UR Well patients did not have a primary care physician (PCP) at the time of their visit (Figure 2).

When patients with insurance and a PCP were asked why they were seeking care at the UR Well clinic rather than at their PCP, patients listed lack of appointment availability at their PCP (48.2%), cost (14.9%), and transportation difficulties (4.9%) as their primary reasons (Figure 3). Of 1,025 patient encounters at Asbury and St. Luke's clinics, 86.8% were employment and school physicals. The remainder of patient encounters consisted of acute visits at 8.3% and dermatology visits at 4.9% (Figure 4). Acute visits consisted of patients seeking medical attention for a chief complaint other than general health assessment and most commonly included upper respiratory distress, musculoskeletal pain and genitourinary distress. Over the past two years, dermatology visits have occurred at the Asbury clinic once per month, and most commonly included patients seeking care for verruca vulgaris and undifferentiated dermatitis. Regardless of chief complaint, most patient visits are first time visits (94.0%) compared to second (5.6%) or third visits (0.4%).

Future Directions

The policies and procedures of St. Joe's are constantly evolving and thus present a challenge to UR Well volunteers seeking to stay current. The St. Joe's training guide is one project that could be updated on a yearly basis by the UR Well Summer Interns and could also serve as a template for guides to other clinics.

The physician-patient relationship in a primary care setting has been shown to be a vital asset for patient and public health (1). Given the population of patients coming to UR Well who are either uninsured or without a PCP, further action to develop and support connections with health care navigators and referrals to PCPs may enable UR Well to better serve their patients. Additionally, further RedCAP data analysis could prove useful to UR Well leadership to help direct future UR Well endeavors.

Zip Code	Patient Encounters
14621	143
14609	126
14611	72
14613	66
14608	63
14605	60
14619	60
14606	37
14620	37
14615	33
14616	26
14612	25
14624	21
14626	18
14580	17
14607	16
14623	15
14610	14
14618	11
14617	9

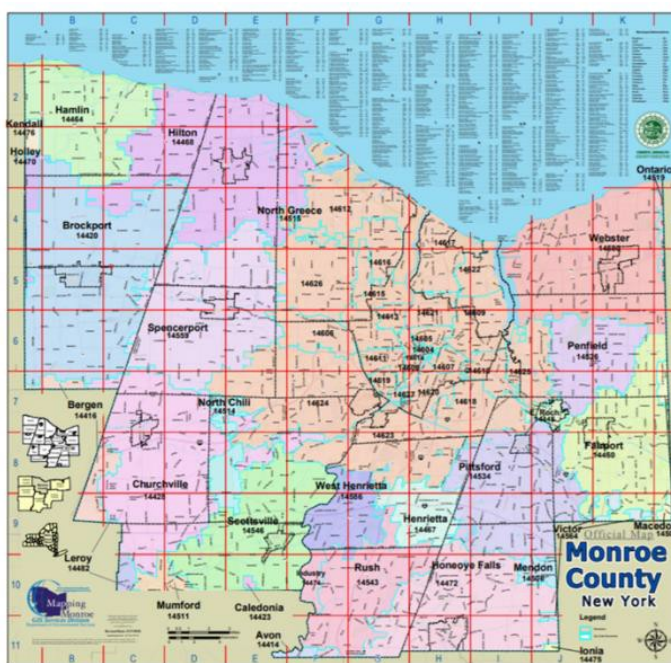


Figure 1: Left - Table of the top twenty most represented zip codes of Asbury and St. Luke's UR Well patients. Right - Map of the cities and zip codes of Monroe County, New York (2).

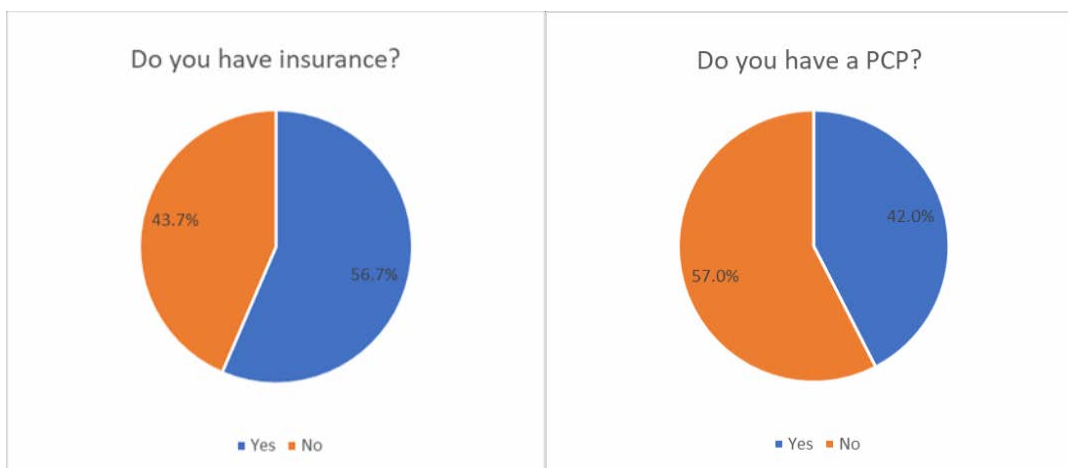


Figure 2: Left – Percentage of Asbury and St. Luke's UR Well patients with and without health insurance (yes: 56.7 %, no: 43.7 %, n = 1,004). Right – Percentage of Asbury and St. Luke's UR Well patients with and without a PCP (yes: 42.0 %, no: 57.0 %, n =1,019).

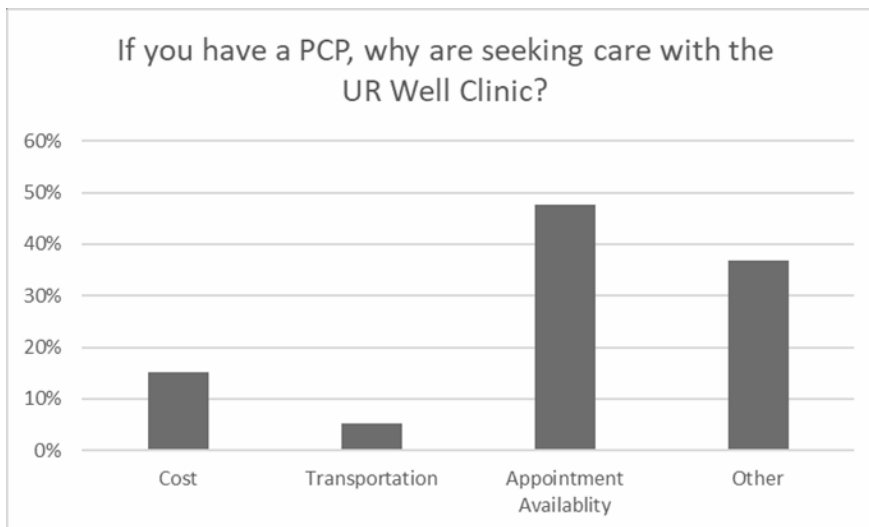


Figure 3: Graph of the percentage of patient responses to why they are seeking care at UR Well clinic (n= 388). Patients indicated PCP's lack of appointment availability (48.2%), cost (14.9%), and transportation difficulties (4.9%) as their primary reasons. 36.9 % of patients answered "Other" in response to this question.

	Encounter 1	Encounter 2	Encounter 3
Acute	79	5	1
Dermatology	39	8	3
Physicals	846	44	0
Total	964	57	4

Figure 4: Table of services provided to UR Well patients since 2016 categorized by acute, dermatology and physicals versus primary patient encounter or return patient encounter (acute 8.3%, dermatology 4.9%. physicals 86.8%, first encounter (94.0%), second encounter(5.6%) and third encounter (0.4%).

Sources:

- 1) Macinko J, Starfield B, Shi L. Quantifying the Health Benefits of Primary Care Physician Supply in the United States. *International Journal of Health Services*. 2007;37(1):111-126. doi: 10.2190/3431-g6t7-37m8-p224.
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Mehta, Varun

Preceptor

Theresa Green, PhD

University of Rochester Medical Center

Center for Community Health and Prevention

Service Learning In Medical Education: Promoting Firearm Safety in the Pediatric Office

Physicians must be able to understand the increasingly complicated healthcare needs of diverse populations. A good way to train medical students to be able to do so is through community health projects. The majority of community health projects can be divided into three categories: educational, clinical, or advocacy related. Medical students are a perfect population to be able to fuel the creation and stability of community health projects. The benefit of doing so is not just confined to the community taking advantage of the program but also for the medical students themselves. Taking part in service learning as a medical student engrains fundamental principles of tending to the community and cultivates a sense of compassion with the future physicians. Throughout the course of the fellowship I meet with several community programs to understand different ways of promoting community health.

In order to further understand the process of creating a community health intervention I worked towards creating a project regarding firearm safety counseling in the pediatric office. Firearms are among the top 3 causes of death for youth in the US and the number one cause of death for African American males aged 15-34 years old. The position of physicians as the promoters of public health makes the doctor's office the prime location to advise patients on firearm safety practices. I planned on surveying pediatricians about their current practices regarding firearm safety counseling and providing them with the appropriate guidelines to pass on to patients. As a part of this I decided to create an informational brochure for patients about the dangers of firearms and simple recommendations to mitigate their risks. Upon, further consideration of the logistics of the project I decided to adapt the target audience from pediatricians to medical students in order to maximize the reach of the message.

Yu, Veronica

Preceptor

Theresa Green, PhD

Julie Kueppers, PhD

University of Rochester Medical Center

Center for Community Health and Prevention

Co-Author

Lucas Santana

Adapting the Healthy Living Program to Reach Rochester's Refugee Communities

The Center for Community Health & Prevention (CCHP) at URMCC collaborates with partners to carry out disease prevention, healthy living programs, research, education and policy - all with the goal to create environments that support healthy behaviors. The Healthy Living Program (HLP) is a community-based fitness and health education program which meets twice weekly for 12 weeks. It emphasizes physical activity and healthy eating in a fun group environment, and it has been carried out in partnership with local community organizations in the Rochester area for many years. This summer, through the E. Cowles Andrus Summer Fellowship for Community Health Improvement, I worked to adapt and expand HLP curriculum to reach Rochester's vibrant refugee communities. Upon resettlement, refugees face many barriers to accessing healthcare, and they also are at higher risk for mental health issues such as post-traumatic stress disorder and depression. In addition, individuals may struggle with social isolation, employment and navigating new environmental factors to achieve wellness. The focus of my work was to make the HLP program relevant to these issues and accessible through visual aids, games and topics of interest as expressed by the participants. We worked in partnership with local organizations Refugees Helping Refugees and Mary's Place to deliver programming to an average of 20 adults and 15 children representing at least 5 spoken languages over the course of 8 weeks. Through this fellowship, I developed strong relationships with individuals from the refugee communities and learned that flexibility and creativity are essential to delivering successful community programs. With future HLP sessions, the CCHP at URMCC will continue to empower members of Rochester's refugee communities to integrate healthy lifestyle practices into their current routines.

Barry, Michaela
Mancho, Amundam

Preceptor
Krit Pongpirul, MD
Chulalongkorn University
Department of Preventative and Social Medicine

Linguistic and Cultural Considerations in Diagnosis Based on Patient Reported Symptoms: Descriptions of Pain & Functional Dyspepsia in Thailand

Functional dyspepsia (FD) is a heterogeneous complex of symptoms presenting with effects in the upper gastrointestinal (GI) tract, with pain localizing to the epigastric region (Enck P. et al. 2017). The diagnosis of FD is made by (1) the subjective assessment of a patient's symptoms and (2) the absence of objective clinical signs of other organic upper GI disease. The international standard for diagnosis is the Rome IV Diagnostic criteria, which is indicated for patients with recurrent and persistent upper GI symptoms that have no apparent abnormalities on diagnostic testing including upper endoscopy, and limited "alarm symptoms" suggesting a more serious GI disease (Drossman, 2016). The vague etiology of FD requires diagnosis based on patient reported symptoms, and the absence of organic disease by standard screening tools.

Patient-reported symptoms are described variably between different cultures and languages. Indeed, the way that symptoms are interpreted within a particular milieu may result in divergent presentations and descriptions of disease. (Hahn, 1995). It is thus important to understand how FD symptoms are described within the cultural context in which a patient lives. For example, it is important to consider that in many Asian countries, patients differentiate between abdominal "pain" and "discomfort". (Carbone F. et al. 2017). Discomfort is an expression that had been used in Rome III, but has since been removed from Rome IV due to non-specificity of the symptom description according to the researchers developing the English language tool (Schmulson M.J. & Drossman D.A., 2017). However, with the removal of "discomfort" as a symptom in the English language screening tool, it is possible that some Asian patients experiencing FD would not describe their symptoms as "painful," and may be excluded by the current instrument.

Moreover, when considering diagnostic instruments for FD and its subtypes, it is important to create instruments capable of distinguishing between FD and other functional GI disorders. This is critical due to the universal difficulty experienced by patients in localizing and describing abdominal discomfort, and the myriad of conditions involving different organs that may cause this discomfort. In particular, among patients throughout Asia, it has been noted that a significant number of patients have been diagnosed with both FD and irritable bowel syndrome (IBS). The FD/IBS co-diagnosis has been noted in China, Japan and Korea (Miwa H. et al., 2012). It is

postulated that nonspecific diagnostic criteria or symptom reporting may contribute to paired diagnosis phenomenon, though there may exist a true overlap between diagnoses (Miwa H. et al., 2012). A similar co-occurrence has also been noted in the co-diagnosis of FD and gastroesophageal reflux disease as well (Miwa H. et al. 2012). Thus, it is important that diagnostic tools are specific to FD symptoms, describing a complex of upper gastrointestinal symptoms that include epigastric pain, burning and/or fullness without apparent organic cause, and exclude symptoms specific to GERD or IBS. Furthermore, it is critical that the descriptions of symptoms are validated between language, ethnicity, and cultural groups.

While Rome IV sought to move away from an exclusively Western ethnocentric focus in symptom description, its application in a number of countries has yet to be validated (Francisconi et al. 2016). Rome IV sought to recognize that social factors including education level, sex, and ethnic background can contribute to a variety of explanatory diagnostic models for health and disease. In addition to social factors, Rome IV commission recognized that genetics, microbiome/post-infectious IBS, environmental hygiene, cytokines, and the effects of CNS may result in different presentation of FD among different individuals and communities (Schmulson & Drossman, 2017). With an appreciation for the biopsychosocial complexity of FD and its increasing prevalence in Thailand, the need for a better understanding of language to describe epigastric symptoms among Thai patients is critical (Kachintorn, 2011).

Researchers sought to ascertain a list of words that patients used to describe epigastric discomfort, as this is the most critical component of FD diagnosis according to the Rome IV criteria in the English language (Suzuki, 2017). FD is commonly considered a “painful” gastrointestinal disorder in communities where the Rome IV criteria were originally developed. For example, a recent review English-speaking patients in the United States commonly describe their FD pain in words such as burning pain (commonly related to stomach acidity and reflux), cramping pain in the upper abdomen, and associated their condition with hunger pains (Taylor F. et al. 2016). It is thus important to understand exactly how patients describe the discomfort associated with their FD in Thailand, and to better understand if pain is considered the major complaint associated with their sickness (Bouchoucha M. et al. 2013).

Researchers conducted a qualitative study of 20 subjects at four different clinical sites. Participants answered interview questions regarding FD symptoms. Participants were asked to describe what “normal” symptoms of epigastric discomfort feel like, for those who regularly experience FD symptoms. With this in mind, participants were also asked to describe the most painful sensation they had experienced related to gastrointestinal symptoms. These questions sought to distinguish between the memory of a particularly acute gastrointestinal complaint, and the common description of recurring gastrointestinal pain, to determine if different words were used to describe each experience. For patients who spoke both English and Thai, descriptions of symptoms were obtained in both languages, in order to compare the words used to describe abdominal pain between cultures.

Researchers talked with 11 patients who spoke exclusively Thai, 4 patients who spoke both Thai and English, and 5 patients who spoke exclusively English to better understand descriptions of abdominal pain. The results of symptoms listed are reported below:

Word in Thai	Translated to English	# Patients who described abdominal pain using this word
ปวด	acute "hurt"	11
เจ็บ	"ache"	4
แสบ	burning, stinging hurt	2
จี๊ด	sharp, piercing	2
บิด	twist	1
จุก	painful pressure	-
เสียด	"focused abdominal pain"	-

The words used by the patients interviewed provide a sample of language used to describe functional abdominal pain in the Thai context. The use of these words is central to the development of a valid instrument to diagnose and assess FD in Thailand, as common descriptions of pain help to reveal patterns of reported symptoms.

The need to better understand patterns of patient reported symptoms is critical to the treatment of FD and the development of better therapeutics for it. Medical practitioners and researchers alike require a systematic means of evaluating symptom type and severity in order to better understand the progression and treatment of FD. However, current literature suggests that no standardized, systematic instrument for the assessment of FD exists due to the complicated nature of developing a systematic, qualitatively based tool (Taylor F. et al. 2016). For example, the "severity of dyspepsia assessment" (SODA) was developed in the United States among a population of primarily white male veterans (Rabeneck, 2001). The population interviewed to validate SODA was not representative of the population of FD patients in the United States, who are predominantly female, and as a result, it is thought to not be an inclusive measure of all of the symptoms that FD patients in the United States experience (Taylor F. et al. 2016). Based on this information, we recommend that FD researchers work to create a systematic list of words and phrases to describe FD symptoms that include both the "pain" symptoms described above, as well as a more holistic understanding of the ways that patients describe functional impairments and discomfort.

As the prevalence of FD continues to grow in Thailand, the development of a systematic instrument to measure a patient's FD symptoms is increasingly important. A systematic instrument will ensure that proper management of the disease is being accomplished, and will aid in the development of better therapeutics for FD. As Thailand is a current world leader in the investigation of FD therapeutics, a systematic tool for FD symptom measurement in Thai patients will benefit the global community of FD patients.

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Buda, Alexandra

Dean, Owen

Preceptors

Sylvia Mwanza-Kabaghe

University of Zambia

Zambia, Africa

David Bearden, PhD

University of Rochester Medical Center

Department of Neurology, Pediatrics

Co-Authors

Heather Adams, PhD

Michael Potchen, MD

Gretchen Birbeck, MD

University of Rochester Medical Center

Easu Mbewe

Pelekelo Kabundelo

University of Zambia

Cognitive Performance and Total and Regional Brain Volumes in Zambian Youth with HIV

Objective:

This study seeks to identify brain volumetric differences between Zambian youth with HIV and a perinatally exposed control group and to examine associations between cognitive function and regional cortical thickness in Zambian youth with HIV.

Background:

Cognitive impairment affects 30-50% of perinatally-infected children with HIV in Sub-Saharan Africa. Pathophysiological models of HIV-associated cognitive impairment suggest that immune activation and chronic inflammation contribute to neuronal injury, eventually leading to neuronal dropout and cortical atrophy.

Design/Methods:

Thirty-three perinatally-infected subjects with HIV between the ages of 8-17 were recruited from the Pediatric Center of Excellence in Lusaka, Zambia as part of the HIV-associated Neurocognitive Disorders in Zambia (HANDZ) study. Six age-matched HIV-exposed uninfected controls were

recruited from the community. T1 sequences were acquired on a 1.5T scanner. Study participants underwent a neuropsychological battery sampling 8 cognitive domains commonly affected in HIV, and a composite "NPZ8" score was generated to summarize cognitive test performance. Regional cortical thickness and volume were estimated and modeled with Freesurfer software.

Results:

We identified decreases in cortical volume (502 cm^3 vs 539 cm^3 , $p=0.118$), left hippocampal volume (3.7 cm^3 vs 3.9 cm^3 , $p=0.113$), and total gray matter volume (669 cm^3 vs 704 cm^3 , $p=0.1379$) between HIV infected subjects and controls. Within HIV positive cases, we identified positive correlations between cortical thickness and NPZ8 score in the right parahippocampal gyrus ($r=0.5051$, clusterwise p -value (CWP)= 0.0010) and medial temporal lobe ($r=0.4983$, CWP= 0.0656). Among cases, we identified an increase in CSF volume in those with malaria history (1055 mm^3 vs 845 mm^3 , $p=0.004$).

Conclusions:

Although limited by the small sample size, these data support the hypothesis that total and regional brain volumes might be utilized as a biomarker for cognitive outcomes in future studies. These data also suggest that malaria coinfection may contribute to brain atrophy or altered cerebrospinal fluid pressure dynamics in pediatric HIV patients.

Chow, Jessica
Iyengar, Mahima
Stettinichs, Kaitlyn

Preceptors
Marc Berliant, MD
University of Rochester Medical Center
Department of General Medicine

C. Luis Vasquez, MD
Yantaló Perú Foundation

Investigating Clean Water Access and Practices in Rural Peruvian Amazonia

Introduction:

Yantaló is a small, rural community in the district of San Martin, Peru with a population of 2779.¹ Nestled in the Amazonian jungle, the town lacks sufficient healthcare and infrastructure, including access to safe drinking water. The threat of contamination of water sources make many in the region vulnerable to diseases such as diarrhea. And even when clean water is available, lack of proper hygiene and sanitation can also lead to illness. Research has shown that improved access to safe water, adequate sanitation, and proper hygiene education can greatly reduce the incidence and impact of water-borne illnesses, especially in areas with limited healthcare delivery and access.² The Yantaló Foundation was created by Dr. Luis Vasquez in 2005 to improve health and education in the Yantaló region and to address the specific health needs of the community. Despite the introduction of running water to Yantaló, access to clean drinking water is still wanting and may be a potential area upon which the Yantaló Foundation can improve.

Objectives:

In our study, we sought to better understand the water hygiene practices and clean water availability in Yantaló. Specific goals of the project were:

1. To analyze water access, use, and treatment practices in the household
2. To identify satisfaction with and perceptions of water quality by the community
3. To estimate the incidence of diarrheal illness in the community, assess its potential connection with water-related variables, and detail health-seeking behaviors

Methods:

We administered surveys to 67 households in Yantaló between June and July 2018. Water access and practices were measured based on a four part survey. The first part of the survey gathered demographic and socioeconomic information. The second part of the survey gathered qualitative

data concerning water source and access, water handling, and individual perceptions on water quality. The third section focused on hygiene practices and sanitation facilities in the household. The final section asked about diarrheal prevalence, individual health, and health-seeking behaviors. Participants were obtained via convenience sampling as we went door to door in the town; respondents must have been at home, available to be interviewed at the time, and met our inclusion criteria (minimum age of 18 and Spanish speaking). The survey was read orally in Spanish by a local translator and responses were hand recorded.

Results:

Demographics and Socioeconomics

67 households were surveyed with the average age of respondents being 44.2 years, and 79% of respondents being female. The average family size was 4.03 with each household on average composed of 2.1 females and 1.9 males. The education levels of the respondents were as follows: 50.7% had complete or partial primary school education; 31.3% had complete or partial secondary school education; 3 individuals had no education (4.5%); and 2 individuals had attended university (3.0%). The majority of households stated that their primary source of income was from farming (59.7%). Other occupations included teacher (2.9%), driver (7.5%), construction worker (7.5%), electrician, security guard, and cook. 97% of households had electricity; 42% of households owned land; 61% owned chickens and 33% of households owned other livestock, such as guinea pigs, cows, or pigs.

Water Access and Handling

All respondents stated that they received water directly from a tap in their home or yard and all experienced interruptions in their service, though responses varied from a few hours to all day in regards to the specific length of the outages. 29.9% of households felt that they always had enough water despite the daily service interruptions. During water outages, people most often used water stored in buckets or other containers (76.1%). In addition, 16 households (23.9%) also obtained water from a well, 3 households (4.5%) purchased water from the store, 2 households (3%) owned water tanks, 1 household (1.5%) obtained water from the Yantaló Clinic, and 1 household (1.5%) obtained water from the river. Of the households that stored water in a container, 92.2% used closed containers, while only 4 households (7.8%) used open containers.

When asked about water treatment, people most often boiled drinking water (78.8%). Other treatment methods employed included bleaching (6.1%) and purchasing drinking water (1.5%); 10.6% of households drank water directly without treating and 3% of households employed more than one treatment method. Of the households that treated their drinking water, 84.5% said that they "always" treated their drinking water, 13.8% said they "sometimes" treated their water, and 1.7% "rarely" treated their water. 78.6% of these households were satisfied with their water treatment methods, while 21.4% were dissatisfied with their current treatment methods. In regards to consumer perceptions and satisfaction, 83.1% of respondents believed water from the tap was not safe to drink without treating, while 12.3% believed the water was safe and 4.6% said they did not know. The main reasons people believed the water was unsafe were the presence of

"germs and bacteria" and the water being "dirty" when it comes out of the tap.

Sanitation and Hygiene

71.2% of households had flush toilets while 27.3% had pit latrines. One household had both types of bathrooms. When questioned about frequency of hand washing, 86.4% of respondents said they "always" washed their hands; 7.6% said they "usually" wash their hands; and 6.1% said they "sometimes" washed their hands. No respondents said they "rarely" or "never" washed their hands. The majority of people claimed to "always" use soap when washing their hands (80.3%); 7.6% used soap "usually"; 9.1% used soap "sometimes"; and 3% "never" used soap. Main sources of hygiene and health information included friends and family (21.9%), school (18.8%), and hospital/health post (34.4%). Other sources of information included the church, internet, and magazines (4.7%). 20.3% of households obtained information from two or more of these sources.

Health

When asked to describe their health, 42.4% of respondents said they were "healthy"; 47% said they had "some health problems"; and 10.6% said they were "not healthy." Of those who reported they were "not healthy" or had "some health problems," reasons included headaches, back pain, GI issues, kidney stones, vision issues, hypertension, hernias, flu, asthma, and diabetes.

Illness Prevalence and Health-Seeking Behaviors

When asked when any member of the household last experienced fever, 25.4% of households reported a fever within the past week, 59.7% within the last month, and 73.1% within the last year. 41.8% of family members experiencing fever were children. Out of households that experienced fever, 50.0% visited a health facility, 33.3% visited a pharmacy, and 13.3% did not seek out treatment. Two individuals (3.3%) stated that they used natural or traditional medicines to treat their symptoms.

When asked when any member of the household last experienced nausea and vomiting, 17.9% of households reported nausea or vomiting within the past week, 26.9% within the last month, and 34.3% within the last year. 34.8% of family members experiencing nausea and vomiting were children. Out of households that experienced nausea and vomiting, 53.3% visited a health facility, 30.0% visited a pharmacy, and 16.7% did not seek out treatment.

When asked when any member of the household last experienced diarrhea, 17.9% of households reported diarrhea within the past week, 32.8% within the last month, and 46.3% within the last year. 41.9% of family members experiencing diarrhea were children. Out of households that experienced diarrhea, 46.2% visited a health facility, 33.3% visited a pharmacy, and 20.5% did not seek out treatment. One individual (2.6%), in addition to visiting a clinic, used natural or traditional medicines to treat their symptoms.

Community Concerns

When asked about the biggest problem facing their community, responses included the

following: Water (41.4%); health and illness i.e. childhood illnesses, anemia, cancer (14.1%); garbage disposal (13.1%); education (10.1%); violence, including violent crimes and domestic violence (8.1%); nutrition (6.1%); and roads (3%).

Conclusions

While all households surveyed had running water, service interruptions occurred daily for several hours, limiting their water access. Additionally, all respondents seemed to understand that the water was not potable and required treatment before drinking. However, the feasibility of constant, vigilant treatment is another question. Although most people surveyed claimed to “always” treat their drinking water and wash their hands, the incidence of diarrheal illness suggests that this may not be the case. It is important to note, though, that their responses demonstrate an understanding for what is considered proper water, sanitation, and hygiene practices. The issue, thus, does not appear to be a knowledge-based one, but a systemic problem involving lack of government management, resources, and/or concern for providing the infrastructure required for clean water in these households.

Acknowledgement

We would like to express our gratitude to the Yantaló Foundation for their incredible support throughout this project. We also thank our advisors at the University of Rochester School of Medicine & Dentistry, Dr. Marc Berliant and Dr. Doug Stockman, for providing mentorship and expertise that greatly assisted this research. Funding support was provided by the Center for Advocacy, Community Health, Education and Diversity (CACHED).

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Cotsalas, Deanna

Preceptors

Marcos Almeida Matos, MD

Bahiana School of Medicine and Public Health

Salvador-Bahia, Brazil

A Qualitative Survey on Perioperative Care for Patients with Sickle Cell Disease in Bahia, Brazil

Introduction:

In a state where the prevalence of sickle cell disease is much higher than in the United States, what perioperative precautions are taken to ensure patient safety and avoid complications due to sickle cell disease?

Sickle-cell disease (SCD) is of very high prevalence in Bahia and has been declared a public health problem in the state^{1,8}. Historically, the state of Bahia had the largest influx of slaves from Africa to Brazil during colonization. The state was founded on this African population, and thus, has a similar genetic profile to different countries in Africa. Out of all children in Bahia, the incidence rate of SCD is 1/650. In some regions throughout the state, this rate can increase to 1/314¹. Without proper treatment and compliance, patients are susceptible to extreme pain, infection, anemia, acute chest syndrome, splenic sequestration, and death. There have been several programs established in Brazil to aid those with the disease, including the Sickle Cell Disease Program and the National Policy for Comprehensive Care of Persons with Sickle Cell Disease and Other Hemoglobinopathies^{1,7}. Despite the establishment of these programs, the field of genetics, although studied in universities and the lab, is culturally viewed as a non- clinical field in Brazil⁴. In addition to the complications that a patient may experience throughout their lifetime, patients with SCD are at a higher risk for surgical complications. This includes perioperative mortality, vaso-occlusive crisis, acute chest syndrome, infections, congestive heart failure, cerebrovascular accident and acute kidney injury¹².

The United States has a mandatory newborn screening program for SCD that is valid across the country⁹. In the U.S., genetics is viewed as a field of medicine, facilitating the establishment of uniform perioperative procedures to be performed on patients with SCD.

These procedures are only enacted in rare cases, as SCD is considered a rare genetic illness in the US. It affects only 100,000 people total in the United States; with an incidence of 1:365 amongst African American births, and 1:16,300 amongst Hispanic American births¹⁰. Due to the rarity of the disease in the U.S., the best perioperative methods are not well-founded. Most studies have small sample sizes over long periods of time and include procedures that have a low to intermediate risk of SCD related complications. A recent Cochran Review on prophylactic preoperative blood transfusions for patients with sickle cell disease concluded "due to lack of evidence this review cannot comment on management for people with HbSC or HbSβ+ disease

or for those with high baseline hemoglobin concentrations"¹¹. This finding is not uncommon with in the field of medicine in the United States. Thus, the uniform perioperative procedures used in the U.S. to reduce surgical complications with SCD patients are often suggestive and non-conclusive. Pre-operative evaluations on patients with SCD in the U.S. include a review of individual crisis triggers, baseline hematologic profile, transfusion requirements, pre-existing organ dysfunction, and opioid use¹². This study explored the topic of perioperative procedures with physicians and medical professionals who operate on patients with sickle cell disease (SCD) in Bahia, Brazil.

Methods:

A qualitative survey was developed and translated into an interview format. Over a period of seven weeks, 8 physicians were interviewed. Each participant had several years of experience working with sickle cell disease patients in a perioperative setting. Recruitment was from several hospitals and sickle cell disease centers across Bahia, Brazil. Physicians were asked about risk analysis, alterations in operative care, and prophylaxis prior to surgery, during surgery, and post-surgery. Data was abstracted and coded for similarities in responses to questions and common themes were identified through qualitative analysis.

Results:

Physicians specialized in pediatric hematology, anesthesiology, and orthopedics. The cohort had a combined 100 years of experience working with sickle cell disease patients, with an average of 12.5 years \pm 9.87. The amount of patients the cohort sees in one year with sickle cell disease is an approximate average of 613.5 patients \pm 1026.5 patients. Out of patients seen in one year, an average of 14.6 patients \pm 7.8 undergo operations in one year. The most common pre-operative risk factor was a hemoglobin level less than 10 g/dl, followed by infection. The most common pre-operative prophylaxis is a blood transfusion to correct for hemoglobin levels < 10 g/dl, this is followed by vaccination, proper hydration and infection prophylaxis. The most concerning risk factor during the operative period was hypoxia and hemolytic crisis, followed by hypothermia, dehydration and thrombosis. Physicians reported operative modifications that most commonly included proper IV hydration and proper oxygenation. Avoiding hypothermia through deliberate heating was also a common theme for operation modifications. Most common postoperative risk factors that physicians consider were hemolytic crisis/ vaso-occlusive crisis, infection, thrombosis, pain, splenic sequestration, hypoxia, hypovolemia, and acute thoracic syndrome. Prophylactic measures to prevent such complications postoperatively includes analgesics, proper hydration, antibiotic prophylaxis, and administering antithrombotic medications. The most common overall top risks that physicians in the cohort considered for sickle cell disease patients in the perioperative period was infection, vaso-occlusive crisis and hydration.

Conclusion:

The purpose of this study was to explore the perspective of medical professionals in the period surrounding operations on patients with sickle cell disease in the state of Bahia, Brazil. This study

revealed what precautions a small cohort of physicians in Bahia take to ensure the best outcomes for their patients.

Uniform practices on how to modify perioperative care for patients with sickle cell disease are not well defined. In the U.S., previous studies have been limited by patient population, due to the rarity of SCD. Bahia is an under-investigated state in Brazil with a high prevalence of sickle cell disease. A comparative study should be completed to compare physician expertise on sickle cell disease patients in Bahia and the U.S. This study suggests that in a small cohort of physicians, common themes are prevalent in the care of this patient population. More studies should be considered to evaluate the expertise of physicians in the state of Bahia, Brazil. Perhaps, this can inform the defining of best practices to prevent perioperative complications in patients with SCD.

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Dean, Owen
Buda, Alexandra

Preceptors
Sylvia Mwanza-Kabaghe
University of Zambia
Zambia, Africa

David Bearden, PhD
University of Rochester Medical Center
Department of Neurology, Pediatrics

Co-Authors
Heather Adams, PhD
Michael Potchen, MD
Gretchen Birbeck, MD
University of Rochester Medical Center

Easu Mbewe
Pelekelo Kabundelo
University of Zambia

Neurocysticercosis and HIV Among Zambian Youth: A Geographic Approach

Objective: To investigate the relationship between HIV and neurocysticercosis using geographic analysis.

Background: Neurocysticercosis is the most common parasitic infection of the brain and a leading cause of epilepsy in the developing world. While neurocysticercosis and HIV co-infections have been reported, there is little data on whether co-infection modifies pathophysiology. As part of the HIV-Associated Neurocognitive Disorders in Zambia (HANDZ) study, we detected a potential cluster of neurocysticercosis cases among children in Lusaka, the capital of Zambia, and utilized geographic information systems to investigate the association.

Design/Methods: 33 study participants ages 8-17 had Magnetic Resonance Imaging (MRI) of the brain performed and evaluated. Standardized interviews were conducted to identify potential risk factors. Participants' homes were approximated using satellite images from Google Maps and OpenStreetMaps using geographic information provided. Latitude and longitude coordinates were plotted into QGIS, an open-source geographic information system software. Maps were generated to visualize where participants live and to assess metrics on the

basis of geography.

Results: Four of 33 subjects with HIV (12%) were found to have neurocysticercosis, specifically the vesicular phase of cysticercosis. Geographic analysis demonstrated that the four neurocysticercosis subjects resided in two adjacent constituencies (Chawama + Kanyama); other participants were distributed roughly equally over the remaining constituencies that were represented in the study. Geographic analysis demonstrated low rates of piped water (Chawama 21.1%, Kanyama 23.2%) and flush toilets (Chawama 11.5%, Kanyama 14.5%).

Conclusions: These results may suggest a geographic trend in neurocysticercosis in Lusaka among constituencies with low rates of piped water and limited access to flush toilets. These features may increase the risk of neurocysticercosis infection. Data on this parasitic infection are largely lacking especially in regard to its interaction with HIV. This study has identified the need for further research on neurocysticercosis and HIV co- infection, and demonstrated the utility of geographic analysis in identifying potential associations.

Dhimal, Totadri
McGann, Kevin

Preceptors
Lois Van Tol, MD
University of Rochester Medical Center
Department of Family Medicine

Teaching to Learn Empowerment through Education on Preventative Medicine

I. BACKGROUND

The long journey of the Refugee does not end with resettlement. In many ways, it is only beginning here. This new chapter, often left out of the story of an exhausting and seemingly endless journey promising with relief at arrival in the United States introduces an unanticipated challenge: permanence. The question mark that was always tomorrow has now been replaced with what will be for the next year or the next generation. Managing the healthcare needs of these populations presents unique challenges to healthcare providers. Nearly 4,000 Refugees resettle in New York alone each year. In 2016, 737 Refugees arrived in Monroe County, the majority being from Somalia, Democratic Republic of Congo, Burma, Syria, Iraq, Bhutan, and Afghanistan (BRIA Population Data for FFY, 2016). While resettlement in the United States offers many positive changes for Refugees, certain challenges of life often remain the same: poverty, poor sanitation, lack of healthcare, and barriers to education. Central to many obstacles faced and especially relevant here are significant language barriers, which hinder refugees from getting adequate information from health examination visits (Wangdahl, Lytsy, Martensson, & Westerling, 2015). Wangdahl et al. (2015) report that 30% of their study participants did not understand what they were being told in the healthcare setting. This presents fundamental problems regarding patient autonomy, let alone health care equity and accessibility. Our principal objective was the development of a more complete understanding of how local Refugees access and interpret healthcare in Rochester, with the end goal of improving healthcare literacy and enabling better-informed healthcare decisions.

II. METHODS

Interactive educational sessions were held at Mary's Place Refugee Outreach in Rochester. Participants were recruited from the English as a Second Language classes. Based upon initial interactions with the communities at Mary's Place, healthcare topics of interest were identified and prepared for each session. Discussions were guided by pictorial pamphlets aimed at easing language barriers and open question and answer. At the end of each session, participants were provided with a written summary outlining topics discussed that day and detailing local resources relevant to the subject. Topics addressed included: navigation of the healthcare system in the United States, infection control and hygiene measures, smoking and substance use

cessation, and mental health. For example, the health care systems discussion opened with an interactive exercise that asked participants to match recognizable pictures of common medical scenarios (e.g. common cold, heart attack, etc.) to the most appropriate healthcare setting for treatment/evaluation. Responses of small groups were then discussed and integrated into more formal teaching objectives about how to access appropriate medical care for a given health concern. Structured discussion focused on differentiating between primary care, urgent care, and emergency/hospital care settings available in the United States. After the conclusion of each session and the dissemination of educational resources, informal discussions with individual members of the Refugee communities were held to provide opportunity for feedback, further questions, and topics of interest to be included in upcoming talks. During this time, the experiences of individual Refugees with healthcare in the United States were often discussed at greater length in order to better enable our understanding of the complexities facing the medical treatment of Refugees and underserved communities in Rochester.

III. OUTCOMES AND FUTURE DIRECTIONS

We have so far been successful in our objective of becoming an educational resource that the Refugee community feels comfortable approaching with topics about health, disease prevention, and the challenges of the United States healthcare system. Our aim is to continue developing our growing relationships and recruiting interest from fellow medical students to establish a more longitudinal educational program between University of Rochester medical students and local Refugee populations.

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Mancho, Amundam
Barry, Michaela

Preceptor
Krit Pongpirul, MD
Chulalongkorn University
Department of Preventative and Social Medicine

Understanding Patient Perspectives and Uses of Traditional, Complementary, and Alternative Medicine

1. OBJECTIVES

The goal of this project was to develop an understanding of patient attitudes and interest in the use of traditional, complementary and alternative medicine regimens, as well as the social factors that may shape the patient's approach to their health. In this study, we considered "conventional western medicine" (CWM) as allopathic medical treatments that are standard in most countries based on international clinical practice. Traditional, Complementary and Alternative Medicine (TCAM) is a broad domain that encompasses health care approaches with a history of use or origins outside of CWM. Such non-mainstream treatments include several modalities including biologically-based therapies (herbal products and vitamin supplements); mind-body therapies (yoga and t'ai chi), manipulative therapies (chiropractic, osteopathic manipulation, massage); energy therapies (acupuncture, reflexology, reiki); and whole-medical system (Chinese medicine, Ayurvedic medicine, homeopathy).² We considered TCAM as a separate treatment system that is efficacious in treating conditions so we focused on that distinction in this study.

2. BACKGROUND

TCAM in Thailand is currently considered as an integral part of the Thai healthcare system, and is promoted by the country's public health policy through the Department for the Development of Thai Traditional and Alternative Medicine.⁴ It is estimated that 26.3% of the adult population of Thailand engages with a provider from a TCAM modality per annum. The majority of the patients who engage with these providers find their services very helpful.³ The Thai government's acceptance of TCAM has fluctuated over the past century. Due to the influence of Western medicine, systematic teaching and governmental support of traditional medicine was abandoned from 1916-1978 in favor of developing schools for CWM.⁴ Traditional medicine modalities continued to be practiced without governmental support, and maintained their role in the cultural of changing government policies, increased access to information through the internet, and increasing global interest in TCAM; we hypothesize that there is diversity in opinions towards the use of TCAM within the Thai population.⁵ In order to support the health of individuals belonging to all social/cultural/religious groups, and ensure that patients receive treatments from all modalities which may be beneficial to their health, it is critical to understand

patients' attitudes and accessibility of Thai Traditional and Alternative Medicine. We hope that more broadly, this research will identify opportunities that physicians may use to talk with patients about health beliefs and Complementary and Alternative Medicine (CAM) that may be beneficial and accessible to them via integrated medical care.

3. METHODS

Male and female patients aged 18 and older; and not too ill, time-limited, or in visible pain to communicate with researchers were recruited by convenience sample to participate in the study. Upon consenting verbally to participate in the study, participants were interviewed in a private location at one of four clinical sites including: Bumrungurad International Hospital, Bangkok, Thailand; King Chulalongkorn Memorial Hospital, Bangkok, Thailand; Udon Thani Hospital, Udon Thani, Thailand; and Thai Traditional Research Institute, Bangkok, Thailand. Open-ended questions were asked during the interview and an application of the photo-voice study structure was used. The questions were developed through extensive literature review with reference to similar studies conducted globally to understand patient attitudes towards complementary alternative medicine. The interview covered four domains: sociodemographic characteristics of study participants, patient lifestyle and spirituality, patient's use of TCAM, and patient beliefs or attitudes towards TCAM. Each interview lasted approximately 15 minutes. Interviews were conducted in English or in Thai (translation services were provided by the clinical site) and were audio-recorded for further data analysis. Prompts were used to clarify questions or whenever a patient did not understand the translation of the question from Thai to English. The study procedure was approved by the University of Rochester School of Medicine and Dentistry Institutional Review Board.

4. ANALYSIS

Qualitative research methods were used to understand the perspective of participants, giving emphasis to the meanings that participants attach to their health experiences and the rationales behind their views. Twenty-two patients were interviewed for this exploratory study. The majority of patients were middle class citizens of Thailand that grew up in urban settings. Four foreign citizens including two who became long-term residents of Thailand were also interviewed and included in the study.

The four key themes that arose from the data to be discussed in this paper are as follows: accessibility and affordability of healthcare services, patient decision making, patient healthcare philosophy, and lifestyle modification.

4a. Accessibility and Affordability of Healthcare Services

The first factor that emerged from the data was about accessibility and affordability of healthcare services throughout Thailand which includes western medicine and TCAM practices (i.e. massage therapy and acupuncture). Interviews demonstrated that all patients who participated in the study are covered by some form of health insurance. All Thai patients in the study were covered through government healthcare insurance; supporting the 2002

Act implemented by the Ministry of Public Health to provide Universal coverage country-wide. Following this Act, the entire Thai population was granted access to essential health services covered by one of the following: the Civil Servant Medical Benefit Scheme (CSMBS); the mandatory Social Health Insurance (SHI); or the Universal Coverage Scheme (UCS), which includes approximately 75% of the population.⁶ The remainder of the study population have private health insurance via employment or by self-payment as was demonstrated by patients included in this study.

Furthermore, in this study all non-Thai patients denied any serious financial or accessibility barriers to receiving health care thus leading researchers to conclude that patients were at least middle class. Patients in this study alluded to affordability of being able to receive services for treatment and/or relaxation.

- "I came to the clinic for Thai massage, my husband works for the government. I can get a cheaper massage here. I have left shoulder problems due to my work as a dentist holding instruments, I come once a week." [Patient 1, TTRI]
- "I came to the clinic because of knee pain and I came for a massage. I come once a week and I have been coming here for a very long time to get massage on both knees. I go to a regular orthopedic doctor as well." [Patient 6, TTRI]

On the contrary, one patient (from Nong Bua Lamphu, the poorest province in Thailand), reported expenses as a barrier to receiving healthcare because she has to travel for over 50 kilometers from her home to the clinic for high quality care following a cerebral hemorrhage. She reported that the hospital in her hometown had referred her for higher acuity care in another city, where the hospital possessed better equipment and specialized medical staff. As a result, the patient reported that expenses remained a significant barrier to her healthcare. This patient's choice was constrained by lack of options for quality healthcare in her hometown, thus requiring travel for needed quality care.

With regards to accessing healthcare, the majority of patients in this study did not complain of distance being an impediment to receiving healthcare. However, 4 out of 22 patients (18.2%) complained about time being a limiting factor to go to the hospital or health clinic for healthcare services due to work and/or activity schedules.

- "It takes a lot of time to go to the doctor." [Patient 6, TTRI]
- "Time is a big influence for me to receive the care." [Patient 4, UT]

This sample is not representative of the Thai population and should not be used to draw generalizations about Thai culture. Study participants were limited to middle class individuals living in or surrounding neighborhoods of urban cities. This study did not consider perspectives of economically disadvantaged individuals or Thai people living in rural areas further away from hospitals or clinical settings.

4b. Patient Decision Making

The diversity of approaches available to maintain or promote health for patients within the Thai healthcare system offers an ability to personalize services to fit the needs of individual patients, based on their personal healthcare philosophy. Patients seeking care from traditional and conventional modalities, across public and private settings, emphasized sentiments regarding the importance of personal trust in providers and responsibility for their own healthcare. This trust, in turn, shaped the services that the patient chooses to seek.

Our study data suggest that the majority of quality services, from conventional hospitals to traditional massage, are accessible to middle-class people living in urban settings. This is due to (1) the Thai universal healthcare insurance program that offers healthcare coverage to Thai citizens, (2) low out-of-pocket costs for treatments, and (3) the high geographic concentration of affordable healthcare services in urban areas.³ The accessibility of healthcare services through the Thai universal healthcare insurance program thus affords patients a degree of choice in their healthcare decisions.

The extent to which patient's choice exists, however, continues to be shaped by the socioeconomic status of the patient. This is illustrated in our study by the patient's decision or requirement to travel for specialized medical care. For some patients, the ability to choose the medical center/clinic involved traveling a long distance due to the patient's selection of the medical center/clinic believed to provide the best quality of service, and other times due to a need for specialized medical procedures not offered close to home. An example is one patient with health insurance who travelled from his home town in Surat Thani to a public hospital in Bangkok for a routine medical check-up. When asked about traveling along distance for routine healthcare, the patient reported that he was willing to make the journey "because it is the best [hospital]!" Possessing the financial capital required to travel and take time off of work, and the insurance scheme to ensure complete coverage of medical expenses, this patient was able to ensure that he received what he believed to be medical care of the highest quality, nearly 650 kilometers from his home. Moreover another patient reported, "people are willing to travel and pay for the best medical care if they can afford it and if they have trusts in the medical providers they're happy to pay." For these patients, cost was not a barrier to high quality medical care, nor was cost a considerable factor in their choice of medical centers/clinics.

It is important to underscore the economic privilege affording higher quality/accessibility of care for patients of higher socioeconomic status even in a healthcare system based on a universal coverage model. Constraints to patient's choice continue to exist for individuals with less economic capital, and for their communities, where top-quality resources are absent. Further research is needed to explore how socioeconomic status and other factors of privilege and capital affect patient decision making with regards to healthcare.

4c. TCAM Use & Practice

This theme suggests most participants used multiple TCAM modalities for their over health. Massage, acupuncture, exercise, herbal teas, herbs and vitamins were among the most reported therapies. The majority of patients acquired this knowledge through communications with family or friends, and/or information in publications and on the internet. TCAM practices were used for three main purposes by the study participants; 1) preventative measures for good health; 2) at the inception of illness as a premeditated treatment option; and 3) when CWM practices have failed to provide adequate symptomatic management. The TCAM treatment practices will be described below.

4c.i. Preventive Measures & Lifestyle Modifications

With regards to preventative measures for good health, Thai patients described the importance of exercise, diet, and other lifestyle modifications to maintain good health and prevent the onset of sickness.

- “Yeah I think food plays like a major role in everyone’s health. You are what you eat, so I think it is important; since healthy foods and exercise keep you well. I think food is even more important than herbs and things.” [Patient 1, BIH]
- “My doctor recommended a vegetarian diet and I transitioned and stopped eating meat. No reactions are occurring!” Overtime she has taken fish oil and Vitamin D supplements regularly and she drinks teas and fresh juices. She gets information from “Mercola website” about alternative medicine and living a natural lifestyle. [Patient 3, BIH]

4c.ii. TCAM as Preliminary Treatment

Focusing next on TCAM as a preliminary treatment at the inception of illness, we found that patients commonly first seek to take care of their ailments at home before following up with formal CWM diagnosis/treatment. The patients who believed in traditional medicines engaged in prophylactic alternative medicine to maintain and restore their health prior to disease onset and progression. With a newly developing illness, these patients commonly engaged in acute self-care by taking additional vitamins, minerals, herbs and over the counter pharmaceuticals. This phenomenon is thus indicative of a more integrative approach to managing one’s health by combining western medicine with TCAM, instead of one modality alone.

- “She drinks tea with herbs from her garden every day even when she gets sick before she seeks medical care.” The patient “takes care of herself” using herbal medicines and lifestyle modifications and then follows with “modern medicine” at the hospital if self-treatment does not provide healing. If that is not working, she seeks “Thai Traditional Medicine”. She believes that the TTM has been worthwhile to take, it has been helping. [Patient 1, UTH]
- Summathi as lifestyle modification for dealing with illness! [Patient 1, KCMH]

Considering these results, the line between prevention of illness and treatment of illness

in its early stages can sometimes be difficult to distinguish, suggesting that TCAM may be considered a kind of lifestyle modification for addressing both wellness and illness in a non-dichotomous way. According to patients, these treatment practices may vary based on current health status, as specific diseases require different therapies based on the acuity and severity of these illnesses. For example, patients described how treatment for the common cold may involve using herbs grown in one's garden, compared to immediately seeking CWM care for a painful medical condition that requires surgery.

4c.iii. Inadequate Symptomatic Management by CWM

A final practice by which TCAM is employed is for the symptomatic management of conditions for which CWM fails to address in a way that the patient feels acceptable. Patients emphasized inadequacies of CWM including the failure of these treatments to fully attenuate symptoms, the side effects of medications, and dangers inherent in surgeries and from drug toxicities, which thus made TCAM practices more appealing. Considering seeking care following the inadequate management of pain by CWM, one patient explained that "he had been taking a medication from his modern medicine doctor and going to a physical therapist, but that has not been helping much." He went on to explain that "the modern doctor also gave him medication, but the modern medicine doctor believes he needs surgery. He thinks that he doesn't want surgery because it puts him at risk for other problems." Thus, when he heard about the TTM clinic, he followed up there.

4d. Patient Healthcare Philosophy

4.d.i. Philosophy of Treatment - Trust in Treatment Modalities

The following is an analysis of the types of treatments engaged by individual patients for the management of their conditions. It is important to note that from the perspective of most US-based literature, it is thought to be important to distinguish if a patient is exclusively using non-CWM treatment (alternative therapy), using both CWM and non-CWM treatment (complementary therapy) or only using CWM therapy ("conventional" therapy). This may be a limitation of our study, as the spectrum of therapeutic philosophies seems more fluid among the patients interviewed in Thailand. Given this, the quotes used to illustrate examples of these particular treatment philosophies are outlined below:

4.d.ii. Alternative Medicine

A number of study patients expressed the lack of trust of western medicine as a philosophy that governed how they managed their personal health. One patient reported that continuous use of "Western medicines accumulates in your liver and causes other problems," hence her preference for traditional Thai medicine. Another patient reported that she "doesn't like the idea of chemicals", and the damage that they cause to the body when trying to treat an illness, thus, she prefers traditional medicine. These patients

engage in traditional medicine as an alternative therapy for their conditions although they seek diagnosis by conventional western medical providers. They do not trust CWM treatments, and choose to receive medical care through traditional modalities.

While some patients expressed a lack of trust in the CWM philosophy of treatment, most patients were accepting of trying CWM therapies at least initially. As some conditions, such as chronic pain, were not adequately treated by CWM a number of patients reported transitioning from CWM treatments to traditional treatments like massage. Chronic pain was perceived to be related to problems “external” or “on the surface,” so direct treatment of the affected area by mechanical pressure was thought to be more beneficial.

4.d.iii. Complementary Medicine

A number of patients continued to use both CWM treatments and a formal complementary traditional medicine approach for treating medical conditions. For example, one patient who had chronic pain following a traumatic injury reported that she sought both anesthetic injections and traditional Thai massage for her chronic pain. She reported that “Western medicine is very rapid and relieves pain temporarily... they give an injection and try to affect something... and you feel better but it does not last long since the pain returns. So I turned to alternative approaches... like massage.” In engaging both modalities for management of her condition, the patient was able to find greater relief.

4.d.iv. Exclusively CWM Medicine

Finally, it is important to note that not all patients are accepting of Traditional, Complementary and Alternative Medicine to manage their conditions. Two patients expressed considerable skepticism towards TCAM approaches, believing that “traditional medicine takes too long to see the results,” for the chronic and disabling condition for which she sought care. The other patient suggested that he did not believe there was enough information about traditional approaches to medicine and that it “lacks evidence to support trying the approach.”

5. CONCLUSION

The data collected from this study contribute an important insight into self-treatment and practices made by patients in urban cities within Thailand. The use of Complementary and Alternative Medicine as a preventative measure or prior to the onset of illness is prevalent in the Thai culture. This results from cultural and social effects with a dominant perception that Complementary and Alternative Medicine modalities can be used to complement western medicine to support one’s overall health. To prevent unnecessary danger; health-care providers should always be aware of the self-therapies made by their patients. In addition, further research on Complementary and Alternative Medicine may be necessary to evaluate the efficacy and safety of these treatments prior to being recommended for patients in clinical settings. Patient

educational programs about the usage of Complementary and Alternative Medicine is warranted to prevent the potential of adverse drug reactions or CAM- drug interaction.

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McCutchan, Keith

Preceptors

Zachary O'Connor

Bongolo Hospital

Republic of Gabon

Pre-Hospital Times and Short Term Outcomes for Orthopaedic Injury: A Prospective Study in a Rural Sub-Saharan African Setting

Background:

Trauma is a major global health concern. While the number of accidents in more developed countries like the US is decreasing, in sub-Saharan Africa, trauma mortality is increasing largely due to increased frequency of motor vehicle collisions (MVC) [1, 2]. It has also been shown that outcomes in rural settings are worse than similar injuries in urban settings [3]. The American College of Surgeons has published a set of guidelines outlining how to best treat the trauma patient. In particular, the ATLS emphasizes speed in treatment, describing a critical "golden hour" in which a trauma patient ought to be treated in order to achieve the best possible outcome [4]. However, there has been little research done in rural areas of the world, particularly in sub-Saharan Africa, with respect to assessment of outcomes after a trauma. There are currently no existing studies in sub-Saharan Africa directly comparing pre-hospital times to short term outcomes for orthopaedic trauma cases.

Bongolo Hospital is a small 158 bed medical facility located in rural southern Gabon, Africa. Many of its patients travel long distances to receive care at Bongolo. It is not uncommon for a patient to travel from Libreville, a 9 hour one way trip by car, for a visit. Many roads in Gabon are unpaved and rarely serviced. There is no emergency medical service for Bongolo or the surrounding area so patients are often driven by family or ride in a shared taxi. As such, Bongolo provides an excellent location to establish a prospective study assessing patient outcomes after orthopaedic trauma in comparison to as prehospital times.

Purpose:

The primary purpose of this study is to address the lack of data on trauma patients in rural sub-Saharan African settings by assessing short term outcomes for orthopaedic trauma patients in relation to their pre-hospital times. Secondly, this study aims to 1) document the epidemiology of orthopaedic injuries that present to Bongolo Hospital and 2) determine the relationship between pre-hospital times and geographic location relative to Bongolo Hospital in order to identify areas in Gabon that might benefit from improved road maintenance or an emergency medical service.

Methods:

A data collection form was created to prospectively gather patient information, pre-hospital history, hospital history, two and six week outcomes. All orthopaedic trauma cases were considered for inclusion in the study. Patients with pathologic fractures, previously treated fractures, nonunion fractures, osteomyelitis and lost to follow-up were excluded from the study. The data collection form was organized into three parts: Pre-hospital and injury data collected at admission, two week follow-up outcomes, and six week follow-up outcomes. Outcomes collected were: duration of stay, whether or not a patient was readmitted, returned to OR, had a surgical site infection, and malunion. Intra and inter-hospital mortality were also recorded. At the follow up appointments patients were evaluated as either complete or incomplete recovery based on their current strength and range of motion as compared to their baseline before injury. Full return to baseline is considered the primary positive outcome for this study. If patients were not present for their scheduled follow-up appointments, outcomes were assessed over the phone.

Results:

This is a prospective study for which data will be collected for one year. Data collection began in July, 2018. As such, there is insufficient data to draw any meaningful results at the time of writing. However, a small unpublished retrospective study done by Bongolo Hospital did suggest that there was a positive correlation between return to function outcomes and shorter pre-hospital times.

Conclusion:

This study hopes to show that there is a meaningful correlation between pre-hospital times and patient outcomes. If that is shown, the study may serve as incentive invest in road infrastructure and early intervention medical services near Bongolo Hospital in Gabon. In addition, this study may help Bongolo and other rural hospitals understand how to best manage orthopaedic injuries by recording what kinds of negative outcomes are common in a rural sub-Saharan African.

Acknowledgements:

I would like to thank the following for their support for this project:

Dr. John Gorczyca, URM

Dr. Jennifer O'Connor, Bongolo Hospital

Dr. Olivier Ndizeye, Bongolo Hospital

Dr. Zachary O'Connor, Bongolo Hospital

Dr. Lemfuka Dieudonne, Bongolo Hospital

URM OME CACHED

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Saxena, Shireen

Preceptors

Shivani Patel, PhD

Rollins School of Public Health, Emory University

Department of Epidemiology

Nikhil Tandon, MD

All India Institute of Medical Sciences

Ministry of Health and Family Welfare of India

I-TREC (Integrated Tracking, Referral, Electronic Decision Support, and Care Coordination): Preparing to Address Diabetes and Hypertension in Punjab, India with Formal Usability Testing



Background: High blood pressure is the leading risk factor for premature death globally. In India, nearly one-third of adults has hypertension, only 25% of which receive treatment. Of those who do receive treatment, 90% are unsuccessful in obtaining healthy blood pressure readings. The National Health Ministry of India established guidelines to address chronic disease within the government healthcare system, specifically requiring universal annual screening of hypertension and diabetes (a common comorbidity of hypertension) since these are preventable chronic diseases which are costly to manage, if left untreated. However, India's 4-tiered healthcare system is largely unprepared for managing the incredibly high disease burden, which exists in the population. To systematically respond to this challenge, I-TREC, an integrated IT Platform was developed in a collaborative research study conducted by the All India Institute of Medical Sciences (AIIMS), Centre for Chronic Disease Control (CCDC), and the Rollins School of Public Health and Department of Global Health at Emory University. However, this tool requires formal usability testing prior to implementation in field sites, and eventually throughout the Indian public healthcare system.

Thus the project accomplishes 2 aims:

Aim 1: To evaluate the process of using the I-TREC interface from both healthcare provider and patient perspectives

Aim 2: To use findings to modify and refine the package prior to full launch

Methodology: In a sub-study conducted by a medical student from the University of Rochester School of Medicine and Dentistry, a formal Usability Test of the I-TREC platform was conducted in the state of Punjab, the project field site. The study enrolled a convenience sample of 11 healthcare providers and 11 patients. The core features of the I-TREC Electronic Health Record (EHR) were evaluated by simulating clinical encounters with both patients and healthcare providers. Metrics designed to evaluate the process of using the I-TREC technological interface in a real life setting was collected. These included clarity, ease of completeness, accuracy, and satisfaction ratings. Additionally qualitative feedback was collected at the end of the simulation from participants.

Data Analysis: Analysis is currently ongoing. This is a descriptive study and distribution of all quantitative variables will be reported (means, median, minimum, max) for all providers and patients and will be further stratified by sex, facility, literacy, as applicable. In addition, qualitative data will be tabulated and analyzed for important themes that need to be addressed.

Conclusion: The findings of this usability test will potentially be used to modify and refine the I-TREC platform prior to full launch in the field. Doing so will not only improve the ease of use for healthcare providers, but it will also improve patient experience as their healthcare providers transition from paper-based to technology-based clinical encounters.

Battaglia, Jennifer

Preceptor

Margie Shaw, PhD, JD

University of Rochester Medical Center

Division of Medical Humanities and Bioethics

Co-Authors

Susan Diass, MA

University of Rochester Medical Center

Division of Medical Humanities and Bioethics

Martha Gdowski, PhD

University of Rochester Medical Center

Department of Neuroscience

The Reflector

The study of anatomy in the Human Structure and Function course in the first year curriculum provides students with the unforgettable experience of learning from anatomical donors. Although we are routinely tested on the anatomical structures and principles that are taught throughout the course, we, as students, have limited time to reflect on and discuss the many personal and professional insights that are gained in the anatomy lab.

In the fall of 2017, faculty members of the Division of Medical Humanities & Bioethics were invited by anatomy faculty into the anatomy labs, with the intention of offering support to students. *The Reflector* resulted from this partnership. This book is a parallel to "The Dissector," the dissection manual used in the anatomy labs. *The Reflector* utilizes components of the humanities such as language, art, history, and narrative. This book includes translations of key anatomical structures from their Latin or Greek origins, to encourage students to understand the meanings of anatomical terms, instead of just memorizing the names of structures. *The Reflector* also provides space for students to draw structures to better understand spatial arrangements. Historical images from original anatomical atlases from the 16th and 17th centuries introduces students to the history of the field, as well as the rich relationship between art and anatomy. Finally, each individual lab in *The Reflector* opens with a reflection from an anatomy faculty member, a senior student, or a member of the Division of Medical Humanities & Bioethics. Additionally, each lab contains pertinent reflection questions, or blank reflection space, which gives students the opportunity to use reflection techniques to process the thoughts, emotions, and questions that may arise in the anatomy labs.

The goals of *The Reflector* include encouraging students to

- 1) Reflect on personal values and beliefs;
- 2) Appreciate different perspectives as individuals, as healthcare professionals, and as team members; and
- 3) Begin to appropriately develop their own professional identity.

Crofton, Kathryn

Preceptors

Martha Gdowski, PhD

University of Rochester Medical Center

Department of Neuroscience

Susan Diass, MA

University of Rochester Medical Center

Division of Medical Humanities and Bioethics

Dissecting Anatomy Lab: Anatomical Gift Giving in Medical Education

Background: Anatomy lab is a rich and colorful place full of many perspectives: the first-year students working together at a table, the body being dissected and that person's past, the teaching assistants returning to lab with the context of greater clinical experience, and the faculty who've dissected many bodies. This is a literature-based project which brings to life some of their stories through a series of creative non-fiction essays based upon oral histories.

Methods: Participants were recruited from the first-year medical student class after completion of anatomy lab (9), third-year anatomy lab teaching assistants (2), medical humanities and anatomy teaching faculty (8), Anatomical Gift Program Staff (2), palliative care clinicians (3), pre-registered donors (2), and family member of a donor (1). Interviewees were asked a series of questions about their motivations to donate their body to medical education, knowledge of anatomical donation, and experiences in anatomy lab. Interviews were transcribed without identifying information, and themes were informally qualitatively analyzed. Themes and transcripts were used to write a series of essays about medical students, anatomy professors, and anatomical donors.

Analysis of Interviews: Why do people donate their bodies to medical education? Interviewees expressed the following motivations: reducing the burden of funeral expenses for family, helping the medical profession, being an educator after life as in life, and serving others.

How do students cope in lab? Participating in an honest and vulnerable community was a common theme noted by the student interviewees. Students reflected about trying to talk about anatomy with their family or friends, who just couldn't completely understand or relate to the experience. Some of the best people to talk about the experience with were lab mates, faculty, and medical professionals who had been through anatomy lab themselves. Students reported that they reflected by: coming into lab to simply be present for a few minutes without studying,

journaling, singing hymns or writing periodic letters to their donor, exercising with classmates, and talking through the issues that bothered them.

Project Outcomes: The primary outcome of this medical humanities project is the completion of a five-part essay series, "Dissecting Anatomy Lab" featuring the stories of medical students, anatomy faculty, and preregistered anatomical donors. This work was presented at a Medical Humanities Noon Seminar. A secondary outcome is the founding of medical student interest group "Progress Notes" dedicated to creating a community of writers and a space to reflect upon experiences in medicine and medical education. Specifically, curriculum was developed for an anatomy lab themed reflective writing workshop, based upon conversations with student interviewees.

YEAR-OUT RESEARCH

Baldwin, Avionna

Preceptor

Addisu Mesfin, MD

University of Rochester Medical Center

Department of Orthopaedics

Co-Authors

Alex Hollenberg

Roman Eliseev, MD, PhD

University of Rochester Medical Center

Department of Orthopaedics

Noriaki Yokogawa, MD

Kanazawa University

Kanazawa, Japan

Defining the Role of BMP Signaling in the Development of Degenerative Disc Disease

Purpose: Degenerative disc disease (DDD) has become an increasing burden on society as the population ages with 80% of the population complaining of back and neck pain at a certain point. The intervertebral disc is composed of two cartilage endplates, nucleus pulposus cells, and annulus fibrosis. Pain associated with DDD can be secondary to dysfunction of all of these parts of the intervertebral disc. This current study sought to determine if upregulation of the BMP-SMAD pathway leads to the development of DDD.

Methods: Human DDD and control intervertebral disc samples were collected and analyzed by immunohistochemistry for expression phosphorylated (active) SMAD1/5/8 (p-SMAD), BMP-2, and Alk3(BMP-2 receptor). Slides were photographed and analyzed for positive and total cell count using OsteoMeasure software. *In vitro*, chondrocyte-like ATDC5 cells were transfected with SMAD1. After 24 hrs media was changed, and 24 or 48 hrs later cells were analyzed for SMAD activity using a luciferase promoter reporter and collected for RNA and protein. RT-PCR was used to assess expression of inflammatory markers (IL6 and TNF α). Western blot was used to assess expression of SMAD, p-SMAD, and Bax (apoptosis).

Results: BMP-2 and p-SMAD expression was significantly higher in patient samples with DDD while Alk3 did not change. *In vitro* we observed that after transfection of ATDC5 cells with SMAD1, SMAD activity significantly increased, protein levels of SMAD, p-SMAD and Bax were elevated, and RNA levels of inflammatory cytokines IL6 and TNF α were upregulated

Conclusion: These results suggest that BMP-SMAD pathway plays a role in DDD pathogenesis by upregulating inflammatory cytokines and apoptotic factor Bax. Future studies will focus on a mouse model of DDD using Alk3 gain of function mice. Currently there are no targeted treatment options for patients with DDD as there is a limited role for spine fusion for back or neck symptoms only. Therefore, understanding which pathway results in DDD can help in the development of future targeted treatment. Importantly this study challenges the current dogma about the role of BMP-2 in treatment for DDD.

Buback, Clayton

Preceptor

Omar Siddiqi, MD

Harvard Medical School

Department of Neurology

Co-Authors

Innocent Titima

University Teaching Hospital

Lusaka, Zambia

Olga Selioutski, PhD

Gretchen Birbeck, MD

University of Rochester Medical Center

Department of Neurology

Estimating the Period Prevalence of Non-Convulsive Status Epilepticus among Comatose Adults at the University Teaching Hospital in Lusaka, Zambia

Objective:

To estimate the prevalence of non-convulsive status epilepticus (NCSE) among comatose adults admitted to the adult medical-emergency unit (AMEU) of the University Teaching Hospital (UTH) in Lusaka, Zambia.

Background:

Comatose patients with epileptiform discharges on a 30-minute EEG are found to have NCSE 40-60% of time on long-term EEG monitoring. NCSE is a treatable cause of coma but little is known about its epidemiology in sub-Saharan Africa due to limited EEG resources. Extrapolation from western epidemiological data may be inappropriate due to different NCSE etiologies and comorbid conditions.

Design/Methods:

From 10/3/2017 - 4/13/2018, patients were screened daily for a Glasgow Coma Score (GCS) of ≤ 10 . Enrolled patients underwent a 30-minute EEG. Demographic and clinical characteristics including duration of coma, past medical history, and coma etiology, if known, were extracted from charts. Structured neurological exam findings were captured. Patients were followed to discharge or death.

Results:

EEGs were completed on 200/322 eligible patients with 122 EEGs being unavailable due to either death (67), recovery to GCS>10, (35), or lost to follow-up within the UTH system (20). Median GCS was 7 (IQR:5-9). Median age was 46 years (IQR:35-63). One hundred six patients (53%) were female. Median coma duration at the time of EEG was 4 days (IQR:2-7). The most common coma etiologies included infection (41%) and stroke (29%). Ten patients (5%) had a history of epilepsy. Fifty-six patients (28%) were found to have epileptiform discharges on routine EEG and 3% were in NCSE. No risk factors for having epileptiform discharges were identified. One hundred thirty-two patients (66%) died, twenty-one (10.5%) were discharged, twenty-one (10.5%) are still currently hospitalized, and twenty-six (13%) were transferred within UTH and lost to follow-up. The presence of epileptiform discharges was not associated with mortality (OR 1.59, 95%CI [0.81-3.15], $p=0.18$).

Conclusions:

Data collection is ongoing. Interim analysis suggests epileptiform discharges are common in adult patients in the UTH AMEU with a GCS of ≤ 10 regardless of history of epilepsy. Routine EEG suggests 14-20% of comatose adults in this African setting may have NCSE. Mortality among comatose patients is high but not associated with epileptiform discharges. NCSE can be a reversible cause of coma and the potentially high prevalence of NCSE in this patient population underscores the need for further investment in EEG capacity in resource-limited settings.

Cowen, Lauren

Preceptors

Elizabeth Loomis, MD

Scott Hartman, MD

Highland Family Medicine

Co-Authors

Christina Gasbarro, Sukanya Srinivasan, and Jocelyn Young

Clinician and Staff Perceptions of Barriers to Providing Contraception in Primary Care

Introduction:

Short interpregnancy periods increase the likelihood of preterm delivery and low birth weight,¹ both of which are significant causes of infant morbidity and mortality.² Since nearly half of pregnancies in the United States are unplanned,³ opportunities exist to better understand barriers to contraceptive services. Studying these obstacles as perceived by clinical staff can better guide programs to improve interpregnancy spacing.

Methods:

Between September and November 2017, 76 staff and 95 primary care clinicians from two family medicine residency practices, Highland Family Medicine in Rochester, NY and St. Margaret Family Medicine in Pittsburgh, PA, completed surveys. Questions assessed perceived barriers to providing contraceptive services, contraception knowledge and opportunities for improvement. Survey-based analysis focused on comparative descriptive statistics between staff and provider responses.

Results:

Clinicians ranked side effects and patient lack of awareness and misconceptions about contraceptive methods more highly than staff ($p=0.0073$ and $p=0.0001$, respectively). Staff identified childcare and work absence as more significant barriers ($p=0.0114$ and $p=0.0380$, respectively). Providers felt appointment timing was the largest constraint to contraceptive care. Staff perceived financial and scheduling to be the top barriers. Non-clinician staff exhibited significant knowledge gaps regarding contraception.

Conclusions:

Numerous modifiable barriers contribute to difficulty providing contraceptive services. Providers and staff largely agree on the perceived barriers, but there is a significant gap in non-clinician staff knowledge of contraception. Education can address one of the leading concerns: lack of awareness and misconceptions regarding contraceptive methods among both staff and patients.

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Jean, Jenny

Preceptor

Deborah Jones, PhD

University of Miami School of Medicine

Department of Psychiatry and Behavioral Sciences

Prevalence of IPV and the Role for Behavioral Interventions in Reducing Internalized HIV Stigma Among HIV Positive Pregnant Women in South Africa

Background: We evaluate the impact a multicomponent, behavioral, prevention of mother to child transmission (PMTCT), cluster randomized controlled trial on HIV stigma reduction among perinatal HIV infected women in rural South Africa. **Methods:** In a cluster randomized controlled trial, twelve community health centers (CHCs) in Mpumalanga Province, South Africa, were randomized; pregnant women living with HIV enrolled received either: A Standard Care (SC) condition plus time equivalent attention-control on disease prevention (SC; 6 CHCs; n =357), or an Enhanced Intervention (EI) condition of SC PMTCT plus the 'Protect Your Family' intervention (EI; 6 CHCs; n =342). HIV infected pregnant women in the SC attended four antenatal and two postnatal video sessions; those in the EI, four antenatal and two postnatal group PMTCT sessions, including stigma reduction, led by trained lay health workers. Maternal PMTCT, HIV knowledge and HIV related stigma were assessed. The impact of the EI was ascertained on stigma reduction (baseline, 12 months postnatally). A series of logistic regression and latent growth curve models were developed to test the impact of the intervention.

Results: In all, 699 women living with HIV were recruited during pregnancy (8–24 weeks), and assessments were completed prenatally at baseline and at 12 months (59.5%) postnatally. Baseline scores of overall HIV related stigma and the four scale factors (personalized stigma, disclosure concerns, negative self-image, and concern public attitudes) decreased at follow-up in the intervention group, while baseline scores of overall stigma and three scale factors (personalized stigma, negative self-image, and concern public attitudes) increased at follow-up in the control group. Using longitudinal analyses, Model 1, which included time-invariant predictors of stigma assessed over the two time periods of baseline and 12 months, increases in stigma from baseline to 12 months were associated with being unemployed, having been diagnosed with HIV before the current pregnancy, and alcohol use. In Model 2, which included time-varying predictors, lower stigma scores were associated with participation in the intervention, greater male partner involvement, and consistent condom use.

Conclusion: The enhanced PMTCT intervention, including stigma reduction, administered by trained lay health workers had a significant effect on the reduction of HIV related stigma.

Koruga, Alex

Preceptors

Christopher Zammit, MD

Nancy Wood, MS

University of Rochester Medical Center

Department of Emergency Medicine

Katherine Rizzone, MD

University of Rochester Medical Center

Department of Orthopaedic and Rehabilitation

Assessment of Health in Rural Haiti & Other Research Projects

Rural Haitians lack access to health care, and few physicians are willing to travel to treat them. We gathered a medical team of two Haitian physicians and five Haitian medical students to visit Mogé, a rural Haitian village near Port-au-Prince, along with several orphanages. The team took health vitals, performed physicals, and prescribed medication as necessary. A religious organization in Rochester provided funding for up to three weeks' worth of medications. Our goal is to come back in one year to assess if the advice of the physician along with limited medication helped, and to install telecommunication software to enable physicians to reach them without the excessive travel time. The principal investigator is Nancy Wood. We gathered the data in rural areas near Port-au-Prince, Haiti over a period of ten days. The preparation before and after, including working on REDCap, was done in the University of Rochester's Emergency Medicine Research department in Saunders Research Building (SRB), Rochester, NY. I also worked on two other research projects with Dr. Christopher Zammit (PI) in SRB. One of them was to determine the relationship between pre-cardiac arrest beta blocker use and the incidence of refractory ventricular fibrillation/ventricular tachycardia amongst patients with cardiac arrest included in the institutional Get with the Guidelines (GWTG) cardiac arrest registry. The other project was done along with Dr. Matthew Leach, a neurology resident, and it involves assessing the association between the subject's immunologic response to a traumatic injury, defined quantitatively by the presence of various leukocyte sub-types, and the progressive increase in size of cerebral contusions, the development of swelling (edema) around those contusions, neurologic outcomes, and systemic complications during the acute hospitalization. Lastly, a project I worked on with Dr. Courtney Jones and Dr. Katherine Rizzone (PI) involved looking at college athletes and the amount of years they spent in their primary sport before entering college, and then comparing that with the amount of head injuries that occurred while playing their college sport. We found that the more time an athlete spent in her primary sport prior to college, the better she was able to avoid major head injuries.

Terry, Treyc

Preceptor

Addisu Mesfin, MD

University of Rochester Medical Center

Department of Orthopaedics

Co-Authors

David Bernstein

Michael-John Betejar

University of Rochester Medical Center

Department of Orthopaedics

**Publication Rate of Podium Presentations from the
Orthopaedic Research Society Annual Meeting**

Annual scientific meetings serve as a forum for dissemination of new research findings. Presentations should be of high scientific quality as they have the potential to impact future research projects and current clinical practice. The publication rate of podium presentations at an annual meeting can be used to assess the quality of the research presented. The purpose of this study was to determine the publication rate of podium presentations at the Orthopaedic Research Society (ORS) annual meeting. All podium presentations from the 2012 – 2014 annual ORS meetings were identified. Abstracts were categorized into an orthopaedic topic. A PubMed search was performed to determine if an abstract reached publication in a peer-reviewed journal. The publication rate was determined for each year. Of the 1063 podium presentations identified, 640 (60.2%) reached publication in a peer-reviewed journal. No significant differences were observed in the publication rate between the orthopaedic topics ($p = 0.3414$). The majority (75.9%) of published abstracts reached publication within 2 years of presentation and the average time to publication was 17.0 months. Abstracts were published in 151 different journals with an average impact factor of 4.46. Time to publication varied significantly by journal ($p = 0.025$). Journal of Orthopaedic Research, Journal of Biomechanics, PLoS ONE, Osteoarthritis and Cartilage, and Bone were the most common publication journals. This study provides insight into the quality of podium presentations at the ORS annual meeting. The ORS annual meeting compares favorably to other orthopaedic surgery meetings

Wirth, Korry

Preceptor

Mary Reid, PhD, MSPH

Roswell Park Comprehensive Cancer Center

Survivorship Care Plans: An Educational Narrative

Understanding biopsychosocial factors and care coordination between oncologists and primary care physicians (PCPs) is critical to providing post-treatment care to cancer survivors as PCPs play a key role in delivering quality survivorship care.^{1-3, 8} However, previous studies indicate that self-perceived knowledge, skills, communication, accessibility to financial or community resources contribute to poor psychosocial outcomes for cancer survivors.^{4,5,7,12,13,15,16,17-20,24-26} Survivorship care plans (SCPs) provide PCPs with a complete summary of their patient's treatment, potential long-term sequelae, and recommendations for follow-up care and screening. While the "Commission on Cancer" has required the integration of survivorship care plans since 2017,^{6,11} several randomized controlled trials have indicated no benefit of nurse-delivered survivorship care plans on patient quality of life and satisfaction with care.^{7,9,10,22,23} Interestingly, however, few survivorship care plans from the study were directly delivered to PCPs in regions that had freestanding survivorship clinical programs.^{4,21} Roswell Park Comprehensive Cancer Center (RPCCC) innovatively developed a patient-centered "Survivorship and Supportive Care Center" (circa 2017) aimed towards easing the clinical burden on oncologists and PCPs by serving as a bridge, directly providing customized SCPs to PCPs, facilitating follow-up appointments with appropriate screenings, and connecting patients to proper community services. This project aims to describe a novel communication tool between oncologists and PCPs in post-treatment cancer care and examine the challenging methodology of survivorship care plans. Moving forward, we will conduct a study to assess if the PCPs who directly receive our care plans find them beneficial.

Yu, Deborah

Preceptor
David Dean, MD
University of Rochester Medical Center
Department of Pediatrics

Co-Authors
Haiqing Bai
Gloria Pryhuber, MD
University of Rochester Medical Center

Decreased Tight Junction Protein Expression in the Alveolar Epithelium of Infants With Sepsis

Background: Acute Respiratory Distress Syndrome (ARDS) refers to a diffuse inflammatory lung injury, rapid in onset that often precipitates respiratory failure and has high mortality. The increased pulmonary vascular permeability and widespread alveolar damage in ARDS is due to disruption of tight junctions that help maintain adequate gas exchange and fluid clearance. Despite the variety of etiologies, including sepsis, ARDS is consistently characterized by decreased expression and aberrant distribution of tight junctions. ARDS in pediatric populations is not well studied and often discussed and managed based on what is known about adult ARDS.

Objective: Compare the pathophysiology, in the lung, of infant sepsis to adult ARDS by observing the expression and distribution of various tight junction proteins in the alveolar epithelium. The tight junction proteins observed are ones that have been shown as decreased in lung samples from adult patients with ARDS.

Design/Methods: Lung sections from infants with sepsis and severe pulmonary edema (gestational age: 31-43 weeks), a pathological hallmark of ARDS, or no lung pathology (36-41 weeks) were inflation-fixed, paraffin-embedded, and immunofluorescently stained using antibodies against tight junction proteins claudin-4, occludin, and tricellulin. The same protocol was applied to lung sections from adults with ARDS and those without lung pathology. Expression was evaluated by blinded reviewers. All samples are from autopsy and obtained in accordance with approved Institutional Review Board and Office for Human Subject Protection protocol.

Results: Tricellulin, Claudin-4, and Occludin expression was decreased in adult patients with ARDS as compared to adult patients with no lung pathology. Tricellulin, Claudin-4, and Occludin

expression was decreased in lung sections of infants with sepsis as compared to lung sections of infants with no lung pathology.

Conclusion: Immunostaining reveals dramatically diminished expression of the tight junction proteins, such that a significant underlying mechanism of ARDS in adults is paralleled in infants with sepsis. As treatments involving tight junction restitution are being explored, infants suffering from poor lung barrier function may benefit, if not more so than adults, from such alternatives to conservative ventilation management.

Zhou, Victoria

Preceptors

David Adler, Md, MPH

University of Rochester

Department of Emergency Medicine

Emergency Department Intensive Care Unit Reduces the Cost of Diabetic Ketoacidosis Management

Objectives: The Resuscitation & Critical Care Unit (ResCCU) is a novel emergency department intensive care unit (ED ICU) that provides early critical care in the ED setting with similar capabilities as an inpatient ICU. Diabetic ketoacidosis (DKA) is a common presenting diagnosis that often allows for quick transition from ICU to lower levels of care. This study examines the cost-efficiency of treating DKA in an ED ICU. We compared the hospital billing charges for DKA patients of our ResCCU versus traditional inpatient ICU care.

Methods: This was a retrospective, single-center cross-sectional study of DKA patients ≥ 18 years old, presenting to an academic, urban hospital ED ($>70,000$ visits/year) over 16 months. Patients were identified by ICD-10 code primary diagnosis of DKA. Patient demographics, physiologic variables, severity of illness scores, and time metrics were extracted from electronic medical records. Hospital billing costs were extracted from our institution's electronic billing system. ICU-level care was defined as ResCCU or inpatient ICU treatment. P-values were calculated for continuous variables from exact Wilcoxon two-sample test (for non-normal distributions).

Results: A total of 41 ED visits with the primary diagnosis of DKA and complete billing records met inclusion criteria. 14 patients were treated in the ResCCU and 27 patients were treated in an inpatient ICU. Mean age (mean \pm SD) was 43.0 ± 21.3 years and 36.6% were male. Median ICU length of stay (LOS) was significantly shorter for ResCCU vs inpatient ICU (respectively, 13.0 hours, IQR 11.0-17.0 vs 27.0 hours, IQR 18.0-43.0; $p=0.0001$). Total hospital billing charges were significantly lower for ResCCU vs inpatient ICU groups (respectively, \$54,035 vs \$68,250; $p=0.02$), while no significant difference was found between ED billing costs (\$7,017 vs \$8,437; $p=0.62$). There was no significant difference of initial bicarbonate, pH, anion gap, Sequential Organ Failure Assessment (SOFA) or Acute Physiology and Chronic Health Evaluation II (APACHE-II) scores and overall hospital LOS between groups.

Conclusions: DKA patients managed in the ResCCU have significantly lower total hospital billing charges and shorter ICU LOS than patients managed by a traditional inpatient ICU stay. An ED ICU may provide a more cost-efficient mechanism for acute DKA management.

Bhatia, Rohini

Preceptor
Surbhi Grover, MD
University of Pennsylvania
Department of Oncology

Co-Authors

Sarah Rayne, William Rate, Lame Bakwenabatsile, Barati Monare, Chidinma Anakwenze, Preet Dhillon, Mohan Narasimhamurth, and Scott Dryden-Peterson

Patient Factors Associated With Delays in Obtaining Cancer Care in Botswana

PURPOSE: Delays in diagnosis and treatment of cancers can lead to poor survival. These delays represent a multifaceted problem attributable to patient, provider, and systemic factors. We aim to quantify intervals from symptom onset to treatment start among cancer patients in Botswana and to understand potential risk factors for delay.

PATIENTS AND METHODS: From December 2015 to January 2017, we surveyed patients seen in an oncology clinic in Botswana. We calculated proportions of patients who experienced delays in appraisal (between detecting symptoms and perceiving a reason to discuss with provider, defined as >1 month), help seeking (between discussing symptoms and first consultation with provider, defined as >1 month), diagnosis (between first consultation and receiving a diagnosis, defined as >3 months), and treatment (between diagnosis and starting treatment, defined as >3 months).

RESULTS: Among 214 cancer patients who completed the survey, median age at diagnosis was 46 years and the most common cancer was cervix (42.2%). 81% of patients were female, 60.7% were HIV-infected, and 56.6% presented with advanced cancer (stage III/IV). 26% of patients experienced delays in appraisal, 35.5% -help seeking, 63.1% -diagnosis, and 50.4% -treatment. Patient income, education, and age were not associated with delays. In univariate analysis, patients living with larger families were less likely to experience a help seeking delay (OR 0.31, $p=0.03$), females and patients with perceived very serious symptoms were less likely to experience an appraisal delay (OR 0.45 $p=0.032$ and OR 0.14, $p=0.02$, respectively).

CONCLUSION: Nearly all patients surveyed experienced a delay in obtaining cancer care. In a setting where care is provided without charge, cancer type and male sex were more important predictors of delays than socioeconomic factors.

Luong, Jennifer

Preceptors

David Adler, MD, MPH

University of Rochester Medical Center

Department of Emergency Medicine

Teri Reynolds, MD, PhD

World Health Organization

Department of Management of NCDs, Disability, Violence and Injury Prevention

Strengthening Global Emergency and Trauma Care Systems: A Year in Review

Every country has its share of life-threatening conditions requiring immediate attention and treatment, but not all countries have the resources and experienced personnel to respond. Many low- and middle-income countries (LMICs), especially those whose populations live in predominantly rural communities, have minimal access to prompt and appropriate emergency care. In 2005, the World Health Organization (WHO) published recommendations for establishing basic emergency medical systems in LMICs, asserting that emergency care was not merely a luxury for those countries able to afford it, but an essential part of any well-planned, successful health system. In 2014, WHO established the Emergency, Trauma, and Acute Care (ETA) Program to standardize the development and evaluation of emergency care systems globally, focusing on the essentials of emergency care.

The aim of this project was to support the ETA Program in developing and strengthening emergency care systems in WHO Member States. The foundation of much of the work was based on the WHO Emergency Care System Framework detailed in the infographic below. The project included researching for, developing, and editing guidance for emergency care provision and system infrastructure along the path of emergency care, from scene of injury or illness, to transport, to the emergency unit in a healthcare facility, and beyond.

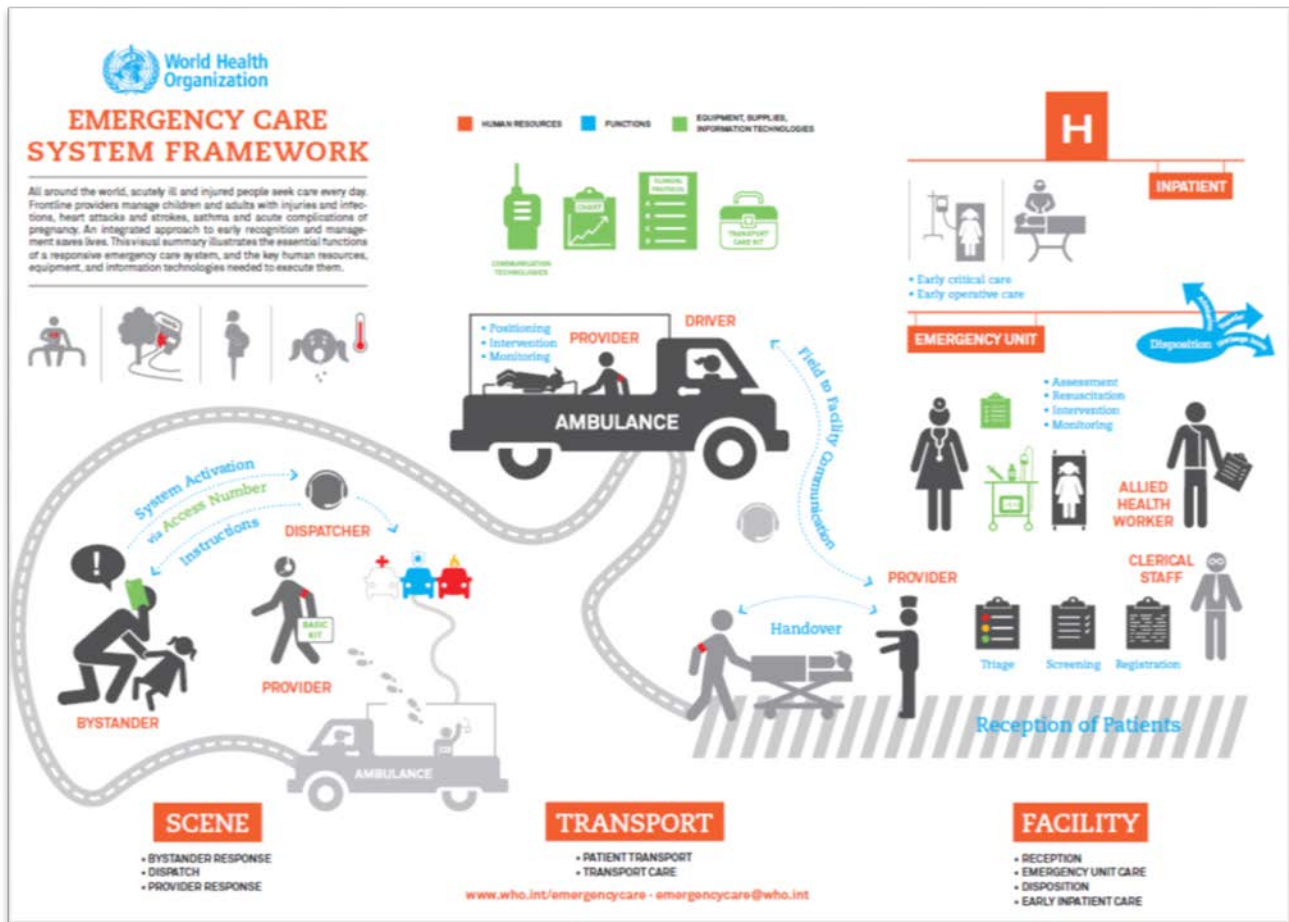
To gain a broad understanding of the state of emergency care systems worldwide, I assisted in the preparations and follow-up work for WHO-led Emergency Care Systems Assessment (ECSA) convening meetings in 4 countries. Additionally, I coordinated the Russian language translation for the assessment tool with the WHO Regional Office in Copenhagen. During these ECSA meetings, health care providers, hospital administrators, government officials in public health as well as Ministries of Environment, Transportation, and more, and prehospital care providers came together to outline existing resources and identify specific resource gaps in the health care system with relation to emergency and trauma care in the country. Examples of gaps include: lack of a universal emergency access number for the whole country, minimal training and certification in care provision during emergency transport, lack of core fixed (as opposed to rotating) staff in emergency units, insufficient resuscitation equipment and materials

in the emergency unit in first-level facilities, and more. Over the course of these multi-day meetings, participants would identify priorities moving forward for strengthening their country's emergency and trauma care system. Examples of priorities include: developing and strengthening prehospital systems, providing formal triage tools for health care workers at all levels of the system, and developing standards for quality improvement to quantitatively assess the system's needs and responses.

To strengthen the gaps identified during these systems assessment meetings, I helped the ETA program organize an international meeting with experts in prehospital care from Asia, Africa, and North America to develop international standard operating procedures and clinical protocols for a basic prehospital care system. The resulting documents are currently being piloted to bolster the prehospital systems in 3 countries in southeast Africa.

Additionally, I participated in the development of a trauma registry program for WHO Member States to use for quality improvement and resource allocation. The program is currently being piloted in a number of countries in Southeast Asia and Africa. Upon completion of the development of the registry, I traveled to Myanmar to introduce the new program to medical providers, hospital administrators, and public health officials in the country. There was significant interest in adopting the program nationally, and I was invited back to Myanmar to assist in the implementation of the trauma registry in the country. The trauma registry will be used as a part of the National Road Map for Trauma Care in Myanmar, and is currently being piloted in half of the tertiary hospitals in the country, with a plan for expansion to the other half in the near future. Ultimately the registry will be used to collect data for national injury surveillance as well as for quality improvement within the facilities.

In addition to the above projects, the broad scope of my work with the ETA program has also included: fine-tuning facility-based assessment tools, designing and fine-tuning standardized clinical tools to be used in conjunction with the trauma registry, coordinating the production of a WHO emergency care resource manual, conducting background research for WHO guidelines and recommendations, and performing data analysis on implementation data from ongoing ETA Program projects.



(Image retrieved from http://www.who.int/emergencycare/emergencycare_infographic/en/)

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Acknowledgements:

I would like to acknowledge the University of Rochester School of Medicine and Dentistry Office of Medical Education for funding support for this project.

Artymowicz, Anna

Preceptors

LaRon Nelson, PhD

School of Nursing

Co-Authors

Francis Boakye

Alex Donkor

Godfred Aaful

Priorities on Rights and Sexual Health

Accra, Ghana

Kwasi Torpey, MD, PhD

University of Ghana

Accra, Ghana

Health and Healthcare Through the Eyes of Muslim HIV+ Men Who Have Sex with Men (MSM) in Ghana; A Photovoice Project

Ghana has been identified by the Joint United Nations Programme on HIV/AIDS (UNAIDS) as one of seven high priority countries with a generalized HIV epidemic and significant gaps in HIV treatment access. One group with a marked treatment gap compared to the general population are men who have sex with men (MSM) - the HIV prevalence MSM is in Ghana is eight times higher than that of Ghana's general population (17% vs. 2%). Despite this, MSM are less likely to be connected to HIV care than the general population living with HIV. Islamic communities in West Africa are known to hold strong stigma against same-sex activities. Given that social stigmas are known to undermine the utilization of HIV/STD care by MSM, this may contribute to the poor health outcomes of Muslim HIV-positive MSM in Ghana. Muslim MSM are underrepresented in existing studies regarding healthcare access for MSM in Ghana. This project explored the subjective experiences of HIV-positive Muslim MSM in managing their health and healthcare using an adapted Photovoice methodology. Participants from Accra (n=5) and Kumasi (n=5) generated photographs to discuss and met for focus group sessions that were transcribed and analyzed using the constant comparative method. Data was combined with additional material to create educational posts on a social media platform. Participants identified the lack of health education and a lack of privacy in and outside of the healthcare setting as main ways that stigma negatively affected health outcomes. Our findings give visibility to a poorly understood group in Ghana and suggest HIV education in the community as well as and infrastructural changes and increased policy adherence in healthcare clinics would facilitate better healthcare outcomes in this group.