Project 1

Title: Personal factors influencing United States medical students' decision to pursue a career in surgery

PI: Jennifer S. Davids, MD, FACS, FASCRS

Interview required: Students should submit CV as well as a 3-4 line statement of interest to the study PI. In-person interviews will be offered to qualified students. Please contact PI at (508)334-8195 or Jennifer.Davids@umassmemorial.org

Description:
Although more women are joining the ranks in surgery and its subspecialties, there are still significantly fewer women than men entering general surgery training programs in 2018. Further, rates of career burnout and attrition from surgical residency are higher in women, compared to their male peers. Consequently, there are fewer women surgeons in academic medicine and in very low numbers in leadership positions and high academic rank. The root cause for this pervasive gender discrepancy is likely multifactorial and evolves with career stage, from student, to post-graduate trainee, to faculty.

My previous work demonstrated that female physicians in procedural specialties face significant challenges related to motherhood, from infertility to financial loss, as well as postpartum challenges (such as breastfeeding) compared to those in non-procedural specialties. These challenges correlated with decreased career satisfaction at both the trainee and faculty level.

How these perceived pressures impact career decisions at the medical student level is not well understood. Current literature focuses more on the impact of external factors--mentorship, role models, interest groups, and the clerkship experience-- on students' career decisions, but the actual nature of their personal concerns about pursuing a career in surgery is not well characterized on a more granular level.

The purpose of this study is to use a social media platform to recruit a large representative national cohort of medical students with interest in surgery, using a web-based survey to 1) determine how personal and social factors influence their career decisions, and 2) to determine whether these factors differ by gender. The eventual aim of this work is to identify actionable areas for focused intervention at the medical student level, with the goal of improving recruitment and retention of women into the field of surgery.

Student's Role:
The student will play a central role in all key elements of the study, from initial study design, drafting an IRB protocol, recruiting subjects, collecting and analyzing data, presenting the data, and writing the manuscript.

Required Skills:
Background in clinical research (clinical research protocols, study design, IRB protocols) is encouraged but not required. Background in scientific writing is helpful. Knowledge of statistics and statistical software is a plus.

Location:
67 Belmont St. Office; could also be performed remotely, in part

Project 2

Title: Massachusetts Child Psychiatry Access Program (MCPAP) for Moms: a follow-up study

PI: Nancy Byatt, DO, MS, Associate Professor of Psychiatry, OB/GYN & Quantitative Health Science

Interview required: Initial interview by CV and 3-4 line statement of interest and follow-up interview in-person. Please contact PI at (508) 856-5812 or Nancy.Byatt@umassmemorial.org

Description:

We have an excellent research opportunity for students interested in Women's Health, Ob/Gyn, psychiatry and/or research. There is a tremendous public health need for research on depression in women as it is the leading cause of disability among women of reproductive age worldwide. One in seven women suffers from perinatal depression and one in five from perinatal mental illness. It has deleterious effects on birth outcomes, infant attachment, and children's behavior/development. Maternal suicide causes 20% of postpartum deaths in depressed women.

The Ob/Gyn and Psychiatry departments have collaborated to create a statewide program that helps providers address mental health conditions in women that are pregnant, postpartum, or considering having children. The program is modeled after the Massachusetts Child Psychiatry Access Program (MCPAP), a successful population-based model for delivering psychiatric care in pediatric settings that has been widely disseminated and implemented across the U.S and is an exemplary model of integrated care. MCPAP for Moms (https://www.mcpapformoms.org/) is an adapted program to support obstetric, primary care, psychiatric and pediatric care providers in addressing perinatal depression and mental illness.

This project will be using data from the MCPAP for Moms program and provides the opportunity for a student to be actively involved in all steps of the research process as well as the opportunity to take the lead on their own related independent project. The student will meet with Dr. Byatt and other faculty for mentorship and supervision, and teaching. The student will have the opportunity recruit and collect data, via participant interviews, from patients regarding their experiences in the MCPAP for Moms program and how it has affected their lives. The student will also have the opportunity to play an active role in preparing, submitting, and coauthoring posters and manuscripts related to the project.

Student's Role:

Responsibilities would include:
Attend research team meetings
Conduct independent project that is related to the main study
Participate in preparing and submitting related posters and manuscripts
Meet regularly with the project team and assist in organizing materials for team meetings and activities.

Assist research team with recruitment activities, interfacing with clinic sites, data collection and management, and other project activities

Location of research:

The student will be co-located with them at the UMMS Systems and Psychosocial Advances Research Center in the Chang Building, Shrewsbury, MA.

Project 3

Title: Implementation of a Peer Support Network to Improve Adherence to Opioid Prescribing Guidelines in Benedict Primary Care Internal Medicine

PI: Jeevarathna Subramanian MD; Associate Professor of Medicine & Phoebe Cushman, MD, MS; Assistant Professor of Medicine

Interview required: CV(s) of interested student(s) and briefly in person with the student(s). Please contact PI's – Dr. Subramanian at 508-334-2731/616-634-0577 or Jeeverathna.Subramanian@umassmemorial.org and Dr. Cushman at 508-774-442-3734/617-455-7779 or Phoebe.Cushman@umassmemorial.org

Description:

Background: Benedict Primary Care Internal Medicine clinic is the university-based outpatient Internal Medicine site, home to 22,500 patients cared for by 30 primary care providers and 35 Internal Medicine residents. Over the past year, we assessed our baseline opioid prescribing patterns and provider needs. With the UMass Office of Clinical Integration (OCI), we created an Opioid Report to track patients of Benedict IM primary care providers (PCPs) who received at least three opioid prescriptions in the previous six-month period.

By combining Epic data with data from the Massachusetts Prescription Awareness Tool (MassPAT), we identified 450 patients for whom Benedict GIM PCPs prescribe long-term opioids. Analysis of our patients who take opioids for chronic pain showed that 18% receive ≥60 MME/day and 25% receive concurrent opioids and benzodiazepines. We also distributed a survey to all 30 Benedict IM PCPs (26 MDs and 4 NPs). Based on our survey (response rate 63%), the four main areas of opioid prescribing for which PCPs responded they needed help were: 1) choosing non-opioid options for pain management, 2) following clinical guidelines, 3) monitoring MassPAT, and 4) managing difficult patients.

Intervention: With the creation of the Benedict Opioid Report, we now have both prescriber-level data and a population-based approach toward improving opioid prescribing safety. Additionally, we have the voices of providers, who are seeking support in all aspects of managing their chronic pain patients.

In our next step, we will apply Lean Methodology to develop and implement a peer support system within Benedict Primary Care Internal Medicine, with the ultimate goal of collaborating with other primary care practices to spread best practices throughout the health system. Our peer support system will utilize the tenets of academic detailing, a provider education tool in which content experts work one-on-one with providers.

Student's role:

This is a clinical research/quality improvement project. The student will be involved in all aspects of research design, implementation, data collection (both quantitative and qualitative), and data analysis. There will be opportunities throughout the summer to participate in clinical work related to the project (e.g. shadow Dr. Cushman seeing patients with chronic pain and/or opioid use disorder, shadow the Pain/Anesthesia physicians in inpatient and outpatient settings, shadow Addiction Psychiatrists on the Addiction Consult service). There will also be possible opportunities for authorship on publications related to this project.

Required skills (if needed):

No specific background is required. The student will be working closely with Dr. Subramanian, who has experience implementing quality improvement around opioid prescribing, and Dr. Cushman, who has a MS in Health Services Research and expertise both in safe opioid prescribing and addiction. Our project is best be suited to someone who has interest in opioids, chronic pain, addiction, quality improvement, and/or medical informatics.

Location of research:

Benedict Building, UMass Memorial Hospital, University Campus

Project 4

Title: Prevalence and Outcomes of Enhanced Sepsis Evaluations in the NICU

PI: Lawrence Rhein, Division Chief, Neonatology

Interview required: CV and interview (in person, or phone). Please contact PI at 508-334-6206 or Lawrence.Rhein@umassmemorial.org

Description:
Most evaluations for potential sepsis in premature infants include only complete blood count and blood cultures. In some cases, despite no difference in symptoms in the infants, providers may choose to obtain additional studies, looking for infection in urine or cerebrospinal fluid. The goal of this project is to describe prevalence of these "enhanced" evaluations and describe results of these work-ups, to help allow more selective use of these additional studies.

Student's role:
Students will perform a retrospective chart review, extract data, and learn how to analyze and present the results.
Interview required: CV and interview (in person, or phone)

Location of research:
Memorial campus

Project 5

Title: Phenotype-based small molecule screening in zebrafish to identify anti-fibrotic therapeutics

PI: Nathan D. Lawson, Professor, Molecular, Cell, and Cancer Biology

Interview required: CV and in person interview. Please contact PI at 774-452-4702 or Nathan.Lawson@umassmed.edu

Description:
Fibrosis is the production and deposition of extracellular matrix that occurs in response to tissue injury. While the initial steps of fibrosis are beneficial, prolonged fibrotic activity can ultimately prevent the healing process and is often associated with chronic tissue damage. In several disease contexts, blood vessel-associated cells known as pericytes have been implicated as major drivers of pathological fibrosis. Thus, targeted strategies to modulate pericyte behavior or differentiation could have a clinically beneficial outcome. In the Lawson Lab, we take advantage of the zebrafish as a model system to screen for small molecules that have therapeutic potential. This particular project will utilize transgenic zebrafish embryos in which a fluorescent protein is expressed specifically in pericytes throughout the circulatory system. We will use these embryos to screen a library of FDA-approved small molecules to identify those that may block pericyte formation. Given the important role of pericytes in fibrosis, compounds identified in this screen may prove helpful to alleviate pathological fibrosis in disease settings.

Required skills (if needed):
Previous experience using pipets.

Location:
364 Plantation Street, LRB617

Project 6

Title: Recognizing and responding to sentinel trauma symptoms in the primary care setting

PI: Sasha Svendsen, MD, Assistant Professor of Pediatrics & Heather Forkey, MD, Associate Professor of Pediatrics

Interview required: CV and interview (in person). Please contact PI's at 774-442-6629 or Sasha.Svendsen@umassmemorial.org & Heather.Forkey@umassmemorial.org

Description:
For many children, traumatic experiences are all too common as 68% of children seen in a pediatric health care setting have experienced exposure to traumatic events, and as many as 90% of children in urban pediatric clinics have had a traumatic exposure. Pediatricians are on the front lines of caring for children and thus have the greatest potential for early identification of and response to symptoms of childhood trauma. The results of recent surveys indicate that most pediatricians do not inquire about or screen for childhood adversities or trauma, nor address parenting anticipatory guidance in the context of trauma. We are currently creating a clinical care process model for primary care providers to screen for early trauma symptoms in children and developing guidelines to advise patients and caregivers when early symptoms of trauma are present, or even before a trauma-exposed child becomes symptomatic. This clinical guideline protocol will be trialed this summer in our pediatric primary care clinic, and a larger, national study proposed based on the outcomes of our trial.

Student's role:
Student will be responsible for obtaining informed consent from family participants, administering the short screening tool, and assisting medical providers in scoring the tool to inform treatment planning.

Required skills:
Comfort interacting and working with patients and families

Location of research:
Benedict building 2nd floor primary care practice

Project 7

Title: Identifying Effective Strategies to Disclose Prognosis in Critically Ill Severe Acute Brain Injury Patients

PI: Susanne Muehlschlegel, MD, MPH; Associate Professor of Neurocritical Care, Department of Neurology, Anesthesia/Critical Care and Surgery

Interview required: Please contact PI at 508-334-4551 or Susanne.Muehlschlegel@umassmemorial.org

Description:
Four out of five patients with severe acute brain injury ([SABI], including large vessel acute ischemic stroke, intracerebral hemorrhage, and traumatic brain injury) die in intensive care units (ICUs) from withdrawal of life-sustaining treatments. This decision is almost always placed on the shoulders of the patients' surrogate decision-makers ("surrogates"), typically the patients' family members', as SABI patients are incapacitated and unable to make their own decisions. Choosing between continuation of care or withdrawal from life-sustaining treatments with comfort care is emotionally, cognitively, and morally difficult for surrogates. It is a value-laden decision involving long-term quality-of-life considerations. Clinicians in the ICU play a pivotal role in surrogates' decision making, as they provide prognostic information, which in turn crucially influences the surrogates' decisions. Highly variable rates of withdrawal of life-sustaining treatments in SABI patients have been repeatedly reported. Several reasons for this exist: The process of deriving at the prognosis, as well as the communication of prognosis to the family greatly depends on the clinician and their communication strategies, but also on the surrogates' abilities to interpret and understand the prognosis. Unfortunately, no empirical studies have addressed what disclosure strategies effectively convey a poor or good prognosis to families of SABI patients. The long-term goal of our research program is to improve decision-making and communication about prognosis for patients with SABI at high risk of death or severe functional impairment through the development and testing of evidence-based interventions. The project's immediate goal is to understand current disclosure strategies of prognosis to surrogates of critically ill SABI patients.
We will conduct a mixed-methods study, employing qualitative and quantitative research methodologies. We will audio record family-meetings between surrogates of SABI patients and clinicians (physicians, affiliate practitioners) and qualitatively code how clinicians disclose prognosis. After these family meetings, we will elicit quantitative prognostic estimates from physicians and families, calculate prognostic concordance, and use multivariate methods to identify strategies that effectively convey prognostic information.

Student's role:
Be in close contact with the ICU nurses and the clinical team to know when a family meeting may occur. On average, 2-6 of such meetings may happen in any given week in the UMASS neuroICU. Approach families and clinicians obtain verbal consent (using IRB approved verbal consent script and fact sheet), and perform the audio recording by attending the family meeting in the background after permission has been obtained.
11/18/2018
• Upload the audio recording to a password protected research hard drive and send the MP3 file to a professional transcription service using a HIPPA safe UMASS data tunnel (MoveIT). • Work collaboratively with members of the study team (research coordinator, PI) • Attend weekly lab meetings; prepare intermittent updates and present to the team at the lab meeting • Learn how to use the qualitative

research software NVIVO; student version/license will be provided by the PI; instruction by other research team members with NVIVO experience • Student will learn about team science, study design, subject verbal consent, literature search, applying other studies to the current research, how to work with families of critically ill patients, and other members of the ICU team, including nurses, residents, attendings and affiliate practitioners. • Student should possess a warm, empathetic personality, while also have the drive, grit and organizational skills to move the project forward. • Student is expected to present the results locally to the immediate research group, local research symposia (at UMASS), and, if abstract accepted, at a national conference. • We aim to prepare the results in abstract form for a poster presentation at a national meeting. Student will learn about abstract writing and submission • One or several published manuscripts are expected to result from this project. Student will learn about manuscript writing and submission.

Required skills:

enthusiasm, diligence, people-skills (need to be able to approach stressed families in the ICU and engage them in a positive interaction with minimal risk research), empathy, grit, team work, reliability, excellent English skills, advanced computer knowledge with advanced skills in WORD, EXCEL, POWER POINT. No expert computer knowledge needed. NIVO qualitative research software experience would be a great advantage, but not required. Interest in qualitative research is a MUST.

Location of research:

University Campus UMMS, Trauma- and Neurointensive care unit at UMASS (Lakeside 2).

Project 8

Title: Gene Modulation During Liver Machine Perfusion Preservation

PI: Paulo Martins, MD, PhD, Department of Surgery, Division of Transplantation

Please send CV by email to Paulo.Martins@umassmemorial.org

Description:
We also have linked our interests of organ preservation with RNA interference. RNA interference (RNAi) is a process through which double-stranded RNA induces the activation of endogenous cellular pathways of RNA degradation, resulting in selective and potent silencing of genes post-transcriptional, which have homology to the double strand. Much of the excitement surrounding small interfering RNA (siRNA)-mediated therapeutics arises from the fact that this approach overcomes many of the shortcomings previously experienced with alternative approaches to selective blocking of inflammatory pathways or apoptosis that use antibodies, antisense oligonucleotides or pharmacological inhibitors.
One important target in our research is cellular apoptosis which plays an important role in ischemia-reperfusion (I/R) injury during organ transplantation. Synthetic small interference RNA (siRNA) targeting FAS has proven effective to reduce ischemic injury and improve outcomes after transplantation.
The central focus of our study is to investigate a possible treatment with FAS siRNA during machine preservation to alleviate I/R injury in a model of rat liver reperfusion and liver transplantation. It's important to mention that gene silencing has never been tested during machine preservation of liver grafts. We are actively proving if we can modulate the transcription of apoptotic genes during machine preservation of liver grafts.

Student's role:
Assisting with rodent liver perfusion, confocal microscopy, assisting with assays. It is expected for the student to write a review paper

Required Skills:
Would be interesting if the student is able to do PCR

Location:
UMass University Campus

Project 9

Title: Isolation of autoreactive T cells directly from the islets of tissue donors with type 1 diabetes.

PI: Sally C. Kent, PhD, Associate Professor of Medicine, Diabetes Center of Excellence

Interview required: In person, interview with the prospective students and a 3-4 line statement of interest would be preferable. Please contact PI at 508-856-2044/774-312-5722 or Sally.Kent@umassmed.edu

Description:
Autoreactive CD4+ and CD8+ T cells infiltrate the Islets of Langerhans in the pancreas and are thought to be a major cause of the destruction of the insulin-producing □slets cells leading to a clinical diagnosis of type 1 diabetes (T1D). Our current understanding of the detailed function of these potentially pathogenic T cells is incomplete in humans and especially from the site of □cell destruction, the islets. We currently have access to a large panel of spleen, pancreatic lymph node and islets isolated from multiple tissue donors with T1D. We have developed assays to culture out autoreactive T cells from these tissues and determine their phenotype and reactivity in order to understand their function. This is an extension of our previously published work (Babon *et al.*, Nature Medicine, 2016).
For this summer research project, we will guide the student in setting up flow cytometric cell sorting assays to isolate and then culture assays to expand autoreactive T cells directly from the islets of tissue donors with type 1 diabetes. This is a unique examination of autoreactive T cells derived from the source of pathology in human T1D.

Student's role:
The student would work directly with myself, Dr. Jenny Babon, a seasoned postdoctoral fellow in the lab, and our flow cytometrist on this project and be involved in discussions of experimental design, execution and analysis.

Required skills:
This is mostly a cell culture project utilizing basic lab skills including analyses of cell sorting/flow cytometry (sorting done by the flow cytometrist). As part of the learning process, Dr. Babon, our flow cytometrist, and I would instruct the medical student in these techniques. Knowledge of immunology would be extremely useful, but not essential.

Length of time:
4-6 weeks is preferable.

Location of research:
ASC 7-2012

Project 10

Title: Therapeutic Management and Neurobehavioral Outcomes of Neonatal Abstinence Syndrome

PI: Elisabeth B Salisbury, PhD, Department of Pediatrics

Interview required: CV required – include 3-4 line statement of interest from the student; interview in person required: student will interview with PI and members of the lab. Please contact PI at 508-334-8627 or Elisabeth.Salisbury@umassmed.edu

Description:
Newborns exposed to opioids during pregnancy often present with a variety of withdrawal symptoms and dysregulated behaviors referred to as Neonatal Abstinence Syndrome. Although non-pharmacological strategies are used to treat withdrawing infants, most often infants require medication (including opioids) to manage withdrawal. Our lab is currently funded by NIH NIDA to study an innovative non-pharmacological intervention complementary to standard of care for treating opioid-exposed newborns. This is a randomized clinical trial that tests a novel non-pharmacological intervention for treating withdrawal in opioid-exposed newborns (clinicaltrials.gov NCT02801331). We are testing whether a specially-constructed crib mattress that delivers uniquely-defined gentle vibrations reduces withdrawal and improves clinical and neurodevelopmental outcomes in this vulnerable population.

Student's role:
Student will receive general supervision from PI as well as direct supervision from lab members who are responsible for carrying out all aspects of our IRB approved, multidisciplinary research studies on opioid-exposed newborns. Student may also have opportunity to participate in other ongoing studies using novel study interventions with additional populations. Our studies are conducted in the Newborn Nursery (NN) and Neonatal Intensive Care Unit (NICU) at UMass Memorial Hospital at UMass Memorial, and in the Pediatric Units on the University Campus. Student will be trained and gain experience in all aspects of bedside clinical research, including identifying candidates and obtaining informed consent, reviewing medical records, conducting studies at the infant's bedside including computerized data acquisition and physiological recording, conducting telephone interviews, compiling data and maintaining spreadsheets and research documents. The student will interact closely with the medical care team of study participants, participating families and members of the research team, and collaborate with investigators in the dual-site NIH funded project.

Required skills:
Must complete the CITI training and receive CITI certification (Human Subjects Research). Must have proficiency in Office (Word, Excel, Power Point), willing to train and learn computer-based data acquisition and database systems, and willing to assist in all aspects of research including interacting with families, medical care team, research staff, and assist with phone interviews, medical record review, data acquisition, spreadsheets and research documents. Must be able to work independently and in group settings.

Location: ***Primary:***
UMass Memorial 119 Belmont Street: NICU and Newborn Nursery

Project 11

Title: Women Leaders in anesthesiology

PI: Manisha S. Desai, M.D., Associate Professor of Anesthesiology, Department of Anesthesiology

Interview required: CV and plus personal interview. Please contact PI at 774-285-5296 or Manisha.Desai@umassmemorial.org

Description:

Background: The chairperson at the department of anesthesiology at perhaps the most famous hospital in the world [Massachusetts General Hospital] is a woman. Although leadership positions for women anesthesiologists may a relatively new development, this has not always been the case. In 1980, hardly a single department chairperson in an academic residency program was a woman.

Methods: Starting from the very first anesthesia residency program in the late 1930s to early 1940s, we collect information about the name and gender of anesthesia chairpersons in every anesthesia residency program in the US. [We could limit it to the top 20 programs, something that will have to be decided later].

Sources: Archival material in these anesthesia departments, and Wood Library-Museum of Anesthesiology. [the candidate should apply for a WLM Fellowship].

Results [Expected]: The number and percentage of women chairpersons in the US has grown progressively over the decades. This will be compared to data on other leadership positions within anesthesiology [ASA presidents, editors of the journal ANESTHESIOLOGY, perhaps other positions as well], and with data about leadership positions for women in society – congress, senate, Fortune 500 chairperson, etc.].

Discussion: While women have provided clinical anesthesia from very early days in the mid-to-late 10th century, and the number of women currently providing anesthesia care in the US is predominantly women [MD and CRNA anesthesia practitioners are about 50,000 each; with most CRNAs being women]. Moreover, the number of women in residency programs too has gradually increased during the study period. However, leadership positions have lagged by several decades. We examine societal factors that could explain these findings, correlating anesthesia leadership data to data about women in leadership positions in general.

Conclusions: We trace the history of women in clinical and leadership positions in academic residency programs in the US and correlate this with societal changes. While it would not be possible to obtain a cause-effect relationship, we believe that societal factors are the primary reason for this phenomenon.

Student's role:

I will provide the student with a few review articles and books related to intravenous therapy and resuscitation. The student will use these and internet-based searches to prepare a list of primary sources. Next, we will obtain copies of these documents and use the information obtained to prepare a coherent manuscript for publication in a peer reviewed journal. The student will be expected to make a presentation at a national or international conference related to history of anesthesia.

Required skills:

Inquisitive mind, love of reading, online search using PubMed, and strong presentation and writing abilities.

Location:

Historical research can be performed from any location with access to online documents. Locating primary documents may require contacting individuals at other institutions.

Project 12

Title: Deciphering the mechanism of ciliary trafficking in photoreceptors

PI: Hemant Khanna, Associate Professor, Department of Ophthalmology & Visual Science

Interview required: Please contact PI at 508-856-8991 or Hemant.Khanna@umassmed.edu

Description:
This project focuses on understanding how defects in neuronal protein trafficking result in photoreceptor degeneration and blindness. Specifically, the student will learn about the different modes of assembly of assembly and function of photoreceptor sensory cilium, a microtubule-based extension of the membrane that detects the light signal. The student will also learn how mutations in ciliary genes cause photoreceptor degeneration. This project involves the use of basic cell and molecular biology techniques, including cell culture, immunofluorescence and retinal tissue sectioning and staining.

Student's role:
The student will be involved with the PI to learn the background and planning of the experiments. He/She will also work with a postdoc in the lab to carry out the experiments and learn troubleshooting. The student will also be expected to present his findings and discuss problems and future directions in weekly lab meetings.

Required skills:
Determination to work hard.

Location:
Albert Sherman Center - AS6-2008

Project 13

Title: Anti-parasitic Bt isolation from environmental samples

PI: Raffi Aroian, Professor, Department of Molecular Science

Interview required: In person or by video conference interview. Please contact PI at 508-856-8169 or Raffi.Aroian@umassmed.edu

Description:
Bt is the number 1 biological pesticide in the world. Our group has discovered it can also be used to control parasitic nematodes. Interested student will screen environmental samples for new Bt isolates that are anti-parasitic.

Student's role:
Use microbiology and molecular biology to identify new anti-parasitic Bt.
Required: PCR, microbiology (basic)

Location:
Campus (Biotech 2); possibility to collect samples from around New England

Project 14

Title: Evaluation of Cephalic Index Norms After the Back to Sleep Campaign

PI: Janice Lalikos, MD, Department of Surgery, Division of Plastic Surgery

Interview required: CV and in person or phone interview. Please contact PI at 508-856-1729 or Heather.Tessier@umassmed.edu

Description: The main question this study is trying to answer is to see if the range of normal head measurements in infants and children has changed across the population since the nationwide launch of the Back to Sleep Campaign in 1992. This will help clinicians in the future to make better decisions about when and how to treat flat head syndrome (plagiocephaly). If the normal range has changed in the past twenty-five years, many children could be spared unnecessary treatment by collecting this information. We are looking to enroll children in the following age categories: 0-1 month of age, 4-6 months of age, 9-12 months of age, 2-3 years of age, 12-14 years of age
As part of the study, we will take measurements of the child's head, and the parent/guardian will also complete a short survey. Information will also be collected from the child's medical record.

Student's Role:
Student will be trained to obtain consent from parents in the clinic, have them fill out a survey on a tablet, and also to measure the children's heads. The student will also be involved in data entry, and possibly statistical analysis of the data. Other duties as necessary/time permits.

Required Skills:
Must complete CITI Human Subjects Online Training modules

Location:
Main office will be S4-740, but subject in the Pedi clinic in the Benedict building

Project 15

Title: A quantitative analysis of the 3D models as a tool for teaching gross anatomy compared to the cadaveric prosection approach.

PI: Yasmin Cater, PhD, Assistant Professor and Founding Director of the Innovations Lab, Department of Radiology and iCELS

Interview required: Please contact PI at 508-450-3412 or Yasmin.Carter@umassmed.edu

Description:
Cadaveric materials such as prosections, have been standard components in gross anatomy education. However, the cost and time associated with cadaveric-based programs and a trend to incorporate methods that reflect continuous scientific advancements has put the role of cadaveric-based teaching methodologies into question. Proposed 'cost effective' 3D models and imaging systems such as CT, MRI and advanced technological visualization platforms, are becoming commonplace; in some cases, replacing cadaveric material altogether. This progression towards 'cadaverless' anatomy programs has led to much debate regarding the effect this has on the preparedness and quality of medical students. That said, analysis of modern teaching methodologies as a replacement to cadaveric material teaching methodologies has been largely qualitative and quantitative analyses have been met with mixed results. Thus, the goal of this study is to quantitatively test the hypothesis 3D models are an equivalent method to the cadaveric prosection method for preparing students for standardized testing of anatomical knowledge. First year medical student participants with little to no prior knowledge of human anatomy (i.e. have not taken any undergraduate anatomy courses) will be randomly assigned to either Group 1 (prosection) or Group 2 (Models). Each participant will be given a one-hour overview of the test structure – the shoulder joint and associated soft tissue structures via the study material of their respective group along with the learning objectives of the study. Assessment will be administered using multi-level tests designed to test participants' level of anatomical comprehension of the Shoulder Joint beyond basic identification skills. To replace cadaveric materials such as prosections, 3D methods must surpass, or at a minimum, equal its application as a method of teaching anatomy, which has yet to be proven. This study is novel in quantitatively assessing 3D models as an equivalent platform for learning human gross anatomy and in identifying the degree to which anatomical knowledge acquired through the standard study of cadaveric prosection can be transferred and applied to modern, technologically advanced imaging systems. Such analyses will provide objective insight into the effects of current educational trends and what role cadaveric materials, such as prosections, should play in the teaching of human gross anatomy.

Student's role:
The student will be engaged with all stages of this study and will be provided with the necessary training and supervision. Their involvement will include: 1. Design and Creation of Anatomical teaching models in the virtual environment; 2. 3D printing or silicon modeling of the models for use in the educational environment; 3. Study design and Data analysis; and 4. Contribution to the preparation of a manuscript.

Required Skills:

Artistic or creative skills are an asset

Location:

The Innovations Lab at iCELS

Project 16

Title: Diving into Clinical System QI

PI: Eric Alper, Department of Quality and Clinical Informatics

Interview required: CV and interview. Please contact PI at Eric.Alper@umassmemorial.org

Description:
Quality improvement is a critical part of health care system management. Patient data, staff feedback and sentinel events can all contribute to improvement. In this project the student will review the ongoing QI initiatives in the clinical system and select one interest to work on with the Chief Quality Officer and team.

Student's role:
Depending on the project will include data review and analysis, record review, participation in QI and research meetings, background literature review or any component necessary to complete a QI project.

Required Skills:
No specific skills required

Location:
Various locations in Worcester

Project 17

Title: Exploring the impact of bias in Standardized Patient interactions with learners

PI: Melissa Fischer, MD MEd, Associate Dean for UME, Curriculum Innovation and iCELS, Department of Medicine

Interview required: Phone interview please contact PI at Melissa.Fishcer@umassmed.edu

Description:
We know that humans have bias (implicit or explicit), and yet we don't know the potential impact on standardized patient interactions. This project will explore that through analysis of the literature and consideration of de-identified student and SP data. The timing is flexible based on student availability, and requires at least 4 and up to 8 weeks.

Student's Role:
The student will assist with any remaining IRB submission needs, review existing literature, assist with data analysis and drafting results and have the opportunity to continue this work if the initial findings warrant. This project will involve interacting with faculty from Quantitative Health Sciences and staff and faculty from iCELS.

Required Skills:
interest in the area of bias in healthcare important, experience in similar work helpful but not required.

Location:
UMMS Worcester, come could be complete off-site

Project 18

Title: Deep dive of Epic sepsis predictive model

PI: Adarsha Bajracharya MD clinical informaticist/hospitalist & Taryn Kennedy MD interim CQO Quality dept, Michelle Kelley RN Sepsis Coordinator

Interview required: CV and interview. Please contact PI at Adarsha.Bajracharya@umassmemorial.org or Taryn.Kennedy@umassmemorial.org

Description:

Each year at least 1.7 million adult Americans develop sepsis and 270,000 die as a result of sepsis each year. 1 in 3 in hospital deaths have sepsis as a primary or secondary diagnosis per latest CDC reports. Early detection and management of sepsis is an integral component of hospital quality improvement efforts. Various tools for early detection of sepsis have been developed in the past and used with varying success. Development and use of machine learning algorithms to predict risk of sepsis is yet another effort in this direction. Given recent advances in computing ability and development of new machine learning algorithms, computers can now process complex data. Epic's Sepsis predictive model is one such tool developed to better predict risk of the development of sepsis. It has been found to have high sensitivity and specificity for hospital populations.

As we roll out this tool across our hospital sites, combining it with complimentary education for our nurses and care providers, we are interested in evaluating and analyzing its impact on nursing and clinician behavior and patient outcomes. This would include analyzing patients diagnosed with sepsis, their sepsis predictive scores at the time of first documentation of sepsis, clinical interventions, and outcome. Complimenting this, we will also analyze all patients who have a sepsis predictive score of 7 or greater during hospitalization and investigate their development of sepsis within 12 hours of the sepsis alert.

Through our effort, we hope to better understand

1. The predictive power of the sepsis tool for our floor inpatients
2. The impact of our rollout effort to help iteratively improve the reach, effectiveness, and adoption of our intervention
3. The impact of our intervention on patient outcomes

Student's role:

Working with the faculty mentors, the student will be involved in reviewing, and analyzing collected data including data validation. This would also include reviewing patient charts for assessment of clinical actions and patient outcomes that may not have been collected through the reports generated. Student may also be involved in project related operational work if interested, which would include participation in continued education on sepsis predictive score and work implications to residents/MD/ AP. Student will be involved in sharing insights from the quality improvement/ research work both internally and externally through poster/ abstracts at local and national level conference/ meetings.

Required Skills:
Access and familiarity with EPIC system

Location:
University Campus

Project 19

Title: Improving patient transitions in case

PI: Andrew Karson, Chief Medical Officer UMMMC

Interview required: CV and in-person interview. Please contact PI at Andrew.Karson@umassmemorial.org

Description:
A primary (Top 3) goal for UMass Memorial Medical Center is ensuring safe and efficient patient transitions through our medical center. A multifaceted program is being developed to improve patient transitions, this includes creating multidisciplinary clinical rounds, streamlining the patient admission process, and evaluating metrics around patient flow, among other activities.

Student's role:
Depending on the project selected by the medical student, the role will include clinical and operational process mapping, learning and leveraging lean and six-sigma techniques to improve processes, data review and analysis, and presentation preparation. The medical student will participate in QI and research meetings and contribute to presentations and scholarly materials that may arise from this work.

Required Skills:
An interest in quality improvement and patient safety.

Location:
UMMMC, primarily University Campus

Project 20

Title: Exploring a new approach to Alzheimer's Disease

PI: Paul Greer, Assistant Professor, Program in Molecular Medicine

Interview required: CV and interview, please contact PI at 617-694-8457 or Paul.Greer@umassmed.edu

Description:
Alzheimer's Disease is a debilitating neurodegenerative disorder for which there are limited effective therapeutic strategies suggesting that new approaches for treating or preventing this disease are needed. We have recently identified a previously undescribed population of microglia, the resident immune cells in the brain, that we believe are critically important for Alzheimer's Disease pathogenesis. We are attempting to figure out what is special about this population of cells and to understand how these cells contribute to Alzheimer's Disease pathology. This work will set the stage for developing new therapeutic approaches for treating this horrible disorder.

Student's Role:
The student would take a variety of approaches to exploring this new population of cells, which might include using single cell transcriptional approaches to characterize these cells, performing cellular assays to investigate the role of these microglia in phagocytosis of harmful stimuli such as amyloid beta, and attempting to identify chemical compounds that activate or inhibit these cells.

Required skills:
No prior skills are needed

Location:
Biotech II building at 373 Plantation Street

Project 21

Title: Medicare Accountable Care Organizations and Outcome of Patients with Heart Failure

PI: Tara Lagu, MD, MPH, Associate Professor of Medicine

Interview required – CV and phone interview. Please contact PI at 413-794-7688 or Tara.Lagu@baystatehealth.org

Description:
More than 5.8 million American adults have heart failure (HF), and prevalence is expected to increase 46% in the next two decades. This burden of disease has led health policy leaders to focus large-scale improvement efforts on the HF population. One of the newer strategies for lowering costs and improving quality of care for Medicare beneficiaries is the implementation of Accountable Care Organizations (ACOs). ACOs consist of groups of doctors and other health care providers who come together voluntarily to provide their patients with coordinated, high-quality care. If these interventions result in lower costs, the providers share the savings with the Medicare program. The objectives for this funded proposal are to use Medicare data to identify high and low-performing ACOs for patients with HF and to additionally conduct a patient-level analysis that will examine changes in outcomes for patients with HF enrolled in ACOs over time compared to those not enrolled in ACOs. We hypothesize that ACO beneficiaries will have greater decreases in emergency department visits and admissions and more modest increases in Medicare payments compared to FFS beneficiaries. During the summer of 2019, our team will begin the process of using Medicare data to ask these questions. The medical student will assist with variable development, literature review, attend team meetings, help to develop research questions related to care for patients with HF in ACOs, and begin to develop and write manuscripts on the topic. Although this study is an early phase, there is an opportunity for participating medical students to play an ongoing role in the full study, which includes qualitative interview with ACO leaders and clinicians, as well as administration of a national survey of all Medicare ACOs. There are also small pieces of this project that would make an excellent Capstone project.

Student's role:
Participate in/learn variable identification, quantitative analysis, development of a qualitative interview guide, conduct qualitative interviews, participate in/learn qualitative analysis, design and test evaluation tool (survey), manuscript preparation

Required skills:
None. We can teach you what you need to know

Location:
Springfield, MA (Baystate Health)

Project 22

Title: Improving Access to Care for Patients with Mobility Impairment

PI: Tara Lagu, MD, MPH, Associate Professor of Medicine

Interview required – CV and phone interview. Please contact PI at 413-794-7688 or Tara.Lagu@baystatehealth.org

Description:
Although the 1990 Americans with Disabilities Act (ADA) and 2008 ADA Amendments Act mandated equal rights in employment and public and private sector services for individuals with disability, people with disabilities still have substantially worse physical and mental health, greater burden of disease, and higher health risks than do nondisabled individuals. This project is therefore focused on developing a novel primary care-focused (but transferable to other outpatient settings) intervention to reduce health disparities for this vulnerable group of patients. At three community health centers that serve a primarily non-white population, we will refine an educational curriculum for clinic staff, develop an intervention for patients with lower limb mobility impairment, and pilot test an evaluation tool that will assess the effectiveness of the intervention. During the summer of 2019, the study team and the study will conduct qualitative interviews, review the prior literature, finalize the educational curriculum for medical assistants about safe transfer practices, and create an implementation plan for identifying patients with lower limb mobility impairment and accommodation needs **prior** to a clinic appointment. Starting late in the summer of 2019, we will then conduct a 3-month pilot to determine enrollment numbers of patients with lower limb mobility impairment that will inform a future randomized controlled trial (RCT). While this study is in its infancy, there is an opportunity for participating medical students to play an ongoing role in the full study and future trial, which will be one of the first RCTs to test an intervention to improve the procedural aspects of care for this population. There are also small pieces of this project that would make an excellent Capstone project (especially for a PURCH student).

Student's role:
Conduct qualitative interviews, participate in/learn qualitative analysis, design and test evaluation tool (survey), (potentially) recruit and consent patients, participate in manuscript development

Required skills:
None. We can teach you what you need to know.

Location:
Springfield, MA (Baystate Health)

Project 23

Title: Preventive Cardiology and Cardiac Rehabilitation

PI: Quinn R. Pack, MD, MSc, Medical Director, Cardiac Rehabilitation and Wellness

Interview required – CV and in person interview. Please contact PI at 413-794-5856 or Quinn.packMD@baystatehealth.org

Description:
Heart disease continues to be the most common cause of death in America. However, studies show that up to 90% of cases could be prevented if all people in America lived an optimal lifestyle, exercised regularly, followed a healthy diet, and were treated for any factors such as high cholesterol, high blood pressure, diabetes, smoking, or obesity. Preventive cardiology aims to prevent cardiac disease before it starts, and cardiac rehabilitation works to help patients recover from heart disease and make needed lifestyle changes to avoid any future heart problems.

The primary goal of this research experience will be to understand and improve preventive cardiology and cardiac rehabilitation. The student will help perform a survey about the incidence of problem drinking in cardiac rehabilitation, survey patients' desires and interest for weight loss. It may also include an evaluation of our new "prehab" program, which uses exercise and education prior to coronary bypass surgery. The student will attend cardiac rehabilitation, preventive cardiology clinic, and observe cardiac exercise stress testing and echocardiography (cardiac ultrasound.) The exact schedule and project will depend on the individual student's interest and schedule.

Student's role:
The student will be expected to have good people skills and be organized.

Required skills:
Database management and statistical experience are not required but would be an advantage. Interest in cardiology is a plus.

Location:
Baystate

Project 24

Title: "Mothering from the Inside Out": Beta-Testing Intervention Training and Delivery through Child Home-Visiting Services for Parents with Addiction"

PI: Elizabeth Peacock-Chambers MD, MS, Department of Pediatrics

Interview required – by phone interview. Please contact PI at 413-794-8301 or Elizabeth.Peacock-ChambersMD@bhs.org

Description:
Mothering from the Inside Out (MIO) is an evidence-based intervention designed to help mothers with addiction cope with stressful parenting situations and support their child's emotional and behavioral development. It improves both parent-child attachment and decreases rates of relapse among mothers. However, MIO is currently primarily delivered in addiction treatment settings making it exceedingly difficult for postpartum women to access this clinic-based service. One novel way of reaching mothers in the postpartum period and making MIO more accessible is by delivering it within the child-focused infrastructure of existing home-visiting services. However, child home-visiting services differ significantly from addiction treatment clinics, requiring adaptation of the training and delivery procedures. In past studies, we conducted focus groups, interviews and formed an Advisory Panel with key stakeholders, all with the purpose of learning the optimal strategies for integrating MIO into home-visiting services. This research study represents the *third phase* of our ongoing work and is designed to beta-test the MIO training and delivery processes for a small group of providers and families they serve.

Student's role:
The student will be involved in a wide variety of activities including data collection, contributing to iterative improvements of the intervention, data analysis, and manuscript writing. The student will also have the opportunity to utilize the data collected by our research group to answer their own novel research question related to this work.

Required skills:
Qualitative research or Quality Improvement experience is beneficial but not required.

Location:
Baystate, Springfield

Project 25

Title: Geographic distribution of adenomatous polyps as a function of adenoma detection rate (ADR)

PI: Vikram Budhraja, MD, Assistant Professor, Director of GI Motility

Interview required – CV and brief phone interview. Please contact PI at 413-534-5398 or Vikram.budhrajaMD@baystatehealthy.org or Vikram.budhraja@gmail.com

Description:
chart review study to examine adenoma detection rates and distribution of adenomas and polyps throughout the colon. We will assess how the ADR relates to geographic distribution of adenomas. We suspect that endoscopists with the highest ADR will also have the highest proportion of adenomas found in the right colon. The difference in geographic distribution of adenomas will likely reflect the distribution of missed adenomas. Knowing where most missed adenomas are located will allow endoscopists to improve their ADR by focusing extra examination time only where adenomas are currently being missed, thereby optimizing efficiency of ADR improvement.

Student's role:
The student will learn basic concepts of study design and understand how we use them to answer specific questions. The student will also observe endoscopy and gain an understanding of the concept of colon cancer prevention with colonoscopy. The student will also participate and engage in all aspects of study performance, including data entry, analysis, and writing.

Required skills:
N/A

Location:
Springfield, MA