2019 CCAG Summer Fellowship Projects

Project 1

Project Title:
Usefulness of Brain CT in Psychosis

Specific skills/training/education required/desired:
Request for minimum of M1 year completion. Microsoft Suite experience, detail oriented and accuracy are a must, able to work independently, understanding of basic medical terminology, ability to follow directions and ask questions when in doubt

Abstract of Research Plan:
Background: To date, most research indicates that CT scans are not beneficial in the initial medical workup due to lack of structural brain pathology and its association with psychosis. However, evidence showing a lack of benefit to brain CT scans has had little impact on clinical practice as numerous scans are still being conducted at our institution as well as worldwide. This is a practice that increases hospital costs and exposes patients to potentially unneeded radiation.
Objectives: The purpose of this study is to assess the prevalence of structural brain abnormalities found in CT scans of patients presenting with psychosis at any point in their disease process.
Methods: This will be a retrospective chart review covering a five year period of time (January 1, 2014 through December 31, 2018) at the Cleveland Clinic, including all affiliated institutions.
Analysis Plan: Descriptive analyses will be presented as proportions for count data and as means with standard deviations (SD) for continuous data. The samples will be separated into two groups, according to the existence of neuroimaging abnormalities (i.e., with vs. without neuroimaging abnormalities). Comparison between the groups will be using chi-squared test for categorical variables (or Fisher exact tests as appropriate) and student's t -test for continuous variables.

Student responsibilities:
Adhere to protocol, review electronic medical records for data specified in protocol, enter data in REDCap, may have opportunity to clean, analyze, and interpret data. Work with assigned resident to ensure Adhere to protocol, review electronic medical records for data specified in protocol, enter data in REDCap, may have opportunity to clean, analyze, and interpret data. Work with assigned resident to ensure accuracy of data. Weekly 1 hour meeting with other research fellows to share experiences, identify and resolve issues. 3 to 5 minute presentation to other research and clinical fellows at end of experience. accuracy of data. Weekly 1 hour meeting with other research fellows to share experiences, identify and resolve issues. 3 to 5 minute presentation to other research and clinical fellows at end of experience.

Clinical opportunities for the students:
Possibility of clinical observation in various settings including consultation-liaison psychiatry, sleep medicine, inpatient psychiatric unit, and others.

Project 2

Project Title:
Long-acting reversible contraception among postpartum women in a federally qualified health clinic: intention versus uptake.

Specific skills/training/education required/desired:
Request for minimum of M1 year completion. Microsoft Suite experience, detail oriented and accuracy are a must, able to work independently, understanding of basic medical terminology, ability to follow directions and ask questions when in doubt

Abstract of Research Plan:
Background: Despite improved access to contraception services unplanned pregnancy remains high with an estimated 50% of all pregnancies in the United States being unintended. Unintended pregnancies result in increased rates of crime and welfare participation, reduced levels of high-school completion and labor-force participation, as well as approximately $21 billion annually in federal and state expenditures.
Objectives: The primary objective of this study is to determine the percentage of women followed at our FQHC who verbalized a desire for postpartum long-acting reversible contraception during their prenatal visits who actually received it within the first six months postpartum.
Methods: This is a retrospective, single center chart review of all women seen at AxessPointe Women's Health Clinic and Cleveland Clinic Akron General for prenatal visits between July 1, 2014 and June 30, 2017.
Planned Analysis: The primary outcome, percentage of women followed at our FQHC who verbalized a desire for postpartum long-acting reversible contraception during their prenatal visits who actually received it within the first six months postpartum, will be calculated by dividing the number of women who received LARC postpartum by the number of women who expressed a desire for it during at least one prenatal visit.

Student responsibilities:
Adhere to protocol, review electronic medical records for data specified in protocol, enter data in REDCap, may have opportunity to clean, analyze, and interpret data. Work with assigned resident to ensure accuracy of data. Weekly 1 hour meeting with other research fellows to share experiences, identify and resolve issues. 3 to 5 minute presentation to other research and clinical fellows at end of experience.

Clinical opportunities for the students:
Possibility of clinical observation in various settings including labor & delivery, gynecologic surgery, various general and subspecialty outpatient offices as well as all resident didactic sessions and attending physician rounds.

Project 3

Project Title:
An Analysis of Opioid Prescribing Patterns, Usage and Implementation of a Take-Back Program in Gynecologic Surgery

Specific skills/training/education required/desired:
Request for minimum of M1 year completion. Microsoft Suite experience, detail oriented and accuracy are a must, able to work independently, understanding of basic medical terminology, ability to follow directions and ask questions when in doubt

Abstract of Research Plan:
Background: Recent studies have concluded that opioids are often overprescribed after surgery and that unused opioids may be diverted for nonmedical use and contribute to opioid-related injuries and death.
Objectives: The primary objective of this study is to evaluate the effectiveness of an opioid take-back program in a gynecologic group practice at a regional medical center. A secondary objective is to identify the prescribing patterns of gynecologists in a group practice at the same regional medical center. Our final objective is to measure patients' post-operative usage of prescribed opioid medications, their self-reported expectations of post-operative pain and satisfaction with post-operative pain management.
Methods: This will be an observational, non-randomized, non-blinded, convenience sample of all patients who undergo gynecologic surgery and receive opioid medications postoperatively between January 1, 2019, and June 30, 2019. Data will be collected regarding type of opioid, number of tablets prescribed and number of tablets returned. Patients will be asked to complete a short survey regarding patients' post-operative usage of prescribed opioid medications, their self-reported expectations of post-operative pain and satisfaction with post-operative pain management.
Analysis Plan: Categorical variables will be reported as n (%) and will be analyzed by chi-square or Fisher's exact test as appropriate. Continuous variables will be reported as mean with standard deviation or median with interquartile range and analyzed by student's t-test or Mann-Whitney U test based on normality of data distribution. We anticipate data will be primarily descriptive in nature.

Student responsibilities:
Adhere to protocol, review electronic medical records for data specified in protocol, enter data in REDCap, may have opportunity to clean, analyze, and interpret data. Work with assigned resident to ensure accuracy of data. Weekly 1 hour meeting with other research fellows to share experiences, identify and resolve issues. 3 to 5 minute presentation to other research and clinical fellows at end of experience.

Clinical opportunities for the students:
Possibility of clinical observation in various settings including labor & delivery, gynecologic surgery, various general and subspecialty outpatient offices as well as all resident didactic sessions and attending physician rounds.

Project 4

Project Title:
Prevalence of Suicidal Ideation and/or Psychotic Symptoms among Patients Diagnosed with Major Depressive Disorder in an Outpatient Clinic

Specific skills/training/education required/desired:
Request for minimum of M1 year completion. Microsoft Suite experience, detail oriented and accuracy are a must, able to work independently, understanding of basic medical terminology, ability to follow directions and ask questions when in doubt

Abstract of Research Plan:
Background: Major depressive disorder (MDD) is one of the most common mental disorders in the United States (US). Depressed patients with symptoms of suicidal ideation (SI) and/or psychosis have worse outcomes on all metrics when compared to age and diagnosis matched controls. Early identification of these symptoms among depressed patients would facilitate timelier initiation of effective treatment and, perhaps, lessen the burden for affected individuals.
Objectives: The primary objective of this study is to identify the prevalence of suicidal ideation and/or psychosis in patients diagnosed with major depressive disorder in an outpatient mental health clinic.
Methods: This is a single center, non-randomized, cohort study. Patient will be asked to complete questionnaires measuring mood, suicidal ideation, and psychotic symptoms.
Analysis Plan: Descriptive analyses will be presented as proportions for count data and as means with standard deviations (SD) for continuous data. Comparison between the groups will be using chi-squared test for categorical variables (or Fisher exact tests as appropriate) and student's t -test for continuous variables.

Student responsibilities:
Adhere to protocol, review medical records and patient completed questionnaires for data specified in protocol, enter data in REDCap, may have opportunity to clean, analyze, and interpret data. Work with assigned resident to ensure accuracy of data. Weekly 1 hour meeting with other research fellows to share experiences, identify and resolve issues. Three to 5 minute presentation to other research and clinical fellows at end of experience.

Clinical opportunities for the students:
Possibility of clinical observation in various settings including consultation-liaison psychiatry, sleep medicine, inpatient psychiatric unit, outpatient psychiatry clinic, substance abuse treatment center, and others.

Project 5

Project Title:
Impact of early initiation of neuropsychiatric medications on agitation and delirium in the intensive care unit

Specific skills/training/education required/desired:
Request for minimum of M3 year completion. Pharmacy students are welcome to apply. No pre-requisite skills are necessary prior to this research experience. The student should have CITI training completed prior to this experience. Additional training will be provided by the study team.

Abstract of Research Plan:

Background: According to one study, approximately 20% of patients in the intensive care unit (ICU) are prescribed a neuropsychiatric medications (NPM) at home.1 These could include selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), benzodiazepines (BZDs), antipsychotics, and gabapentinoids. The result of abruptly stopping these medications on admission can cause significant withdrawal symptoms. One of the major withdrawal symptoms that is common with all NPMs is agitation.1-4 The average onset of withdrawal symptoms varies between drug classes, but can be anticipated within 5 ☐ 2 days.1 A study by M La, et al. found that restarting ☐ 50% of NPMs within 5 days of admission was associated with a median daily Richmond Agitation and Sedation Scale (RASS) of -1.5 (-2.0, -1.0), compared with late restarts with median daily RASS of -2.0 (-3.0, -1.3) (p = 0.02).1 A systematic review by JM Kelly, et al. analyzed 13 different studies for the benefits or harm of continuing patient's home SSRI/SNRIs when admitted to the ICU.4 The authors concluded that there is no clear evidence addressing the question of whether to continue or restart SSRI/SNRIs in patients who were prescribed them prior to admission.

Methods: This is a single-center retrospective cohort study including all patients admitted to intensive care units over the 12-month period from January 1, 2018 to January 1, 2019. Patients will be included if they are 18 years of age or older, admitted to the ICU for at least a 72 hours, and are currently prescribed a NPM on a prior to admission (PTA) medication list that was verified by a pharmacist. Patients will be excluded if they are pregnant, being treated for severe alcohol withdrawal, drug overdose, cardiac arrest, if they received paralytics for reasons other than rapid sequence intubation, prescribed a long-acting injectable on the PTA medication list, or being treated for active neurologic injuries or receiving a neuro-intervention procedure. The primary outcome of this study is to evaluate the number of episodes of a RASS of +2 or higher or a Confusion Assessment Method for the ICU (CAM ICU) positive assessment in patients who were restarted on 50% of their home NPMs within 72 hours. The secondary outcomes of this study will include the number of days up to 72 hours that patients have a RASS score of +2 or higher, the number of days up to 72 hours that patients have a CAM-ICU positive assessment, the percentage of ICU patients who have RASS scores of +2 or higher, and the percentage of patients who are CAM-ICU positive during their admission. A Student's t-test or Mann-U Whitney test will be used to evaluate for differences in continuous variables as appropriate. A chi-squared or Fisher's exact test will be used for nominal variables. Statistical analysis will be performed using IBM SPSS statistics version 24.0 and the level of significance set at p less than 0.05 (two-sided).

Student responsibilities:
NPM study:
- Data collection using REDCap
- Data analysis and statistics
- Manuscript preparation

NECSin study (secondary study, if time permits)
- Patient enrollment
- Data collection using REDCap
- Assist with additional site recruitment and DUA
- Prepare manuscript of study design/methodology for the journal, Trials

ARC study (NEW study, if time permits)
- Literature review
- Protocol development
- REDCap development for data collection
- Creation of the IRB application

Clinical opportunities for the students:
The student would have clinical opportunities to round on the SICU team. The student would also have the opportunity to shadow for administrative experiences, such as the sepsis committees, ICU committees, etc, if they desire to attend. Educational experiences would be available, including trauma grand rounds, surgical resident didactics and pharmacy resident didactics.

Project 6

Project Title:
Breakthrough Ischemic Strokes in Anticoagulated Patients

Specific skills/training/education required/desired:
Request for minimum of M1 year completion. Pharmacy students are welcomed to apply.
Microsoft Word, Excel, and PowerPoint experience required.

Abstract of Research Plan:
Stroke is the fifth leading cause of death in the US and is the leading cause of disability. Although anti-platelet therapy accounts for majority of secondary stroke prevention, use of anticoagulation in stroke treatment has emerged as a powerful resource in high risk situations such as atrial fibrillation and hypercoagulable states. Availability of novel anticoagulants within the last decade has also increased reliance on such medication due to their better relative safety profile. Many such patients however continue to experience 'breakthrough strokes' despite maximal treatment and good compliance. The aim of this study is to explore the risk factors in such patients. This research is important because it can help identify individuals who remain at risk of stroke despite being on presumed optimal medical treatment. This may also help identify additional risk factors of stroke which are often overlooked in routine workup for patients with strokes.

Student responsibilities:
- Data collection using Epic, Chartmaxx and REDCap
- Data analysis and statistics
- Poster and Manuscript preparation

Clinical opportunities for the students:
Clinical shadowing in the Department of Neurology

Project 7

Project Title:
Effectiveness of Shared Medical Appointments in Patients with Obesity: Clinical Trial at an Urban Medical Center to Evaluate a Novel Approach in Weight Loss Management.

Specific skills/training/education required/desired:
Request for minimum of M1 year completion. Microsoft Suite experience, detail oriented and accuracy are a must, able to work independently, understanding of basic medical terminology

Abstract of Research Plan:
Study 1: Effectiveness of Shared Medical Appointments in Patients with Obesity: Clinical Trial at an Urban Medical Center to Evaluate a Novel Approach in Weight Loss Management.
The primary objective of this study is to determine whether Shared Medical Appointment (SMA) setting will result in better weight loss results in patients with a diagnosis of obesity in a six month period at an urban medical center. The secondary outcomes that will be studied will be the whether SMAs result in better HbA1c control, better blood pressure control, better body measurements, and better patient attendance than traditional one to one appointments. We hypothesize that since SMAs provide additional emotional support, and a longer time frame for the physicians to provide health education and recommendations, the SMAs will result in greater weight loss over the time period of 6 months. Additionally, we hypothesize that since the weight loss is expected to be greater with the intervention of introducing SMAs, patients attending SMAs will have improved testing for other comorbidities, including diabetes (improved HbA1c), and Hypertension (improved blood pressures).

Study 2 (if time permits): A randomized controlled trial of blood flow restriction plus conventional physical therapy vs. conventional physical therapy alone in the treatment of lateral epicondylagia
The purpose of this study is to determine if a new technique using a blood flow restriction tourniquet can help when added to the standard physical therapy program in the treatment of lateral epicondylitis/tennis elbow. The specific aims of the study are; 1) To evaluate if a BFR rehabilition program results in superior self reported function and pain compared to a usual care group in the treatment of lateral epicondylosis. 2) To determine if a BFR rehabilitation program results in increased grip strength compared to a usual care group in the treatment of lateral epicondylosis.

Student responsibilities:
Study 1: SMA
-        Data collection using Epic and REDCap
-        Data analysis and statistics
-        Poster and Manuscript preparation

Study 2: BFR (secondary study, if time permits)
-        Data collection using Epic and REDCap
-        Assist with patient enrollment

Clinical opportunities for the students:
The student will be able to shadow Family Medicine residents and staff members leading the project. Will also have the opportunity to attend weekly Family Medicine didactics (Wed 1-5pm)

Project 8

Project Titles:
1) Evaluation of magnetic resonance imaging as a clinical management tool in patients with severe head injury.
2) Prevalence of Vitamin D Deficiency in Geriatric Trauma Patients

Specific skills/training/education required/desired:
All students are encouraged to apply. Must be able to navigate medical charts and have an understanding of medical terminology under the guidance of clinical and research faculty.

Abstract of Research Plan:
Study 1: Clinical Traumatic brain injury (TBI) is a leading cause of death and disability in the United States, estimated to affect 1.7 million people annually**.** Current literature surrounding the use of MRI in the evaluation of severe TBI has been centered on outcome prediction. One systematic review and meta-analysis found a strong association between brainstem lesions on MRI and unfavorable long-term prognosis in patients with moderate and severe TBI.5 Despite the accepted prognostic value of MRI, to date very few studies have explored the impact of MRI findings on clinical management. In one such study, a 3-year prospective study of 123 trauma patients who had MRI within 48 hours of admission, they found there was no change in treatment because of MRI findings. This led the authors to conclude that head CT is the only imaging test necessary in the first 48 hours after TBI, and that MRI, although useful in providing prognostic information, is an unnecessary use of expensive resources in this setting. Therefore, the purpose of this study is to review the degree to which utilization of MRI and the interpretation of its findings in the evaluation of severe head injury led to alterations in clinical management.

Study 2: The prevalence of Vitamin D deficiency ranges from 20% to 100% among older adults in the United States.2 Vitamin D deficiency has been correlated with increased risk of osteoporosis, depression, decline in cognitive function and poor immune status. Hence, studying the prevalence of the Vitamin D deficiency among geriatric trauma patients presenting with fall and/or fracture will help us determine the actual magnitude of this condition. In addition, Vitamin D deficiency is associated with poor healing and decline in immune function, which are crucial for recovery in trauma patients. Therefore, our study will also focus on estimation of inadequately treated and untreated patient proportion among the geriatric Vitamin D deficient population.

Student responsibilities:
The student will be responsible for completing various components of the research process, including literature review, data abstraction, writing of results, and preparation of presentations/abstracts under the guidance of faculty members.

Clinical opportunities for the students:
The student will be expected to attend didactics and group lectures with resident physicians during their time at Cleveland Clinic Akron General and will be offered shadowing experience as physician schedules permit.

Project 9

Project Title:
Cost Differences between Emergency Medicine Physicians and Physician Assistants in the Emergency Department

Specific skills/training/education required/desired:
All students are encouraged to apply. Must be able to navigate medical charts and have an understanding of medical terminology under the guidance of clinical and research faculty.

Abstract of Research Plan:
Prior research has evaluated costs of care when using different types of providers such as nurse practitioners (NP), physician's assistants (PA) and resident physicians. A review of the literature suggests that NPs reduced wait times for the ED, lead to high patient satisfaction and provided a quality of care equal to that of a mid-grade resident. Cost, when compared with resident physicians, was found to be higher. Overall there is a paucity of literature directly evaluating the cost of care for the same conditions between physicians assistants, residents supervised by an attending physicians and attending physicians. The objectives of this study are as follows:

Primary Objective: To determine if the cost of an encounter for a patient when seen by a physician assistant versus an attending physician vs. an attending physician and an emergency medicine resident are different for specific diagnosis.

Secondary Objectives: To determine if the number of tests ordered, medications prescribed and operational metrics are different between providers.

Student responsibilities:
The student will be responsible for completing various components of the research process, including literature review, data abstraction, writing of results, and preparation of presentations/abstracts under the guidance of faculty members.

Clinical opportunities for the students:
The student will be expected to attend didactics and group lectures with resident physicians during their time at Cleveland Clinic Akron General and will be offered shadowing experience as physician schedules permit.

Project 10
Project Title:
Evaluating the incidence of c-spine damage with no neck pain in intoxicated patients following mild head trauma

Specific skills/training/education required/desired:
All students are encouraged to apply. Must be able to navigate medical charts and have an understanding of medical terminology under the guidance of clinical and research faculty.

Abstract of Research Plan:
Clinically important cervical spine injury is often defined as any fracture, dislocation, or ligamentous instability detectable by diagnostic imaging and requiring surgical intervention or specialist follow-up. Blunt traumatic injuries to the spine are rare, ranging from 1 to 3% of cases. When evaluating potential cervical spine injuries two current guidelines are often used: NEXUS and Canadian C-Spine criteria.
When applying NEXUS criteria any evidence of intoxication warrants diagnostic imaging even with a normal alertness level. Criticism of the Canadian C-spine criteria revolves around a complicated algorithm to implement in practice, although the Canadian C-spine rule can be applied in patients with evidence of intoxication if they are alert and cooperative with exam. Intoxication is common in trauma patients with up to 50% of all trauma patients having some level of intoxication from alcohol or illicit drugs at the time of trauma. Little has been done to investigate the effects of intoxication alone in identifying low risk for injury. With a large percentage of blunt trauma patients presenting with some level of intoxication, many will have diagnostic imaging based on NEXUS criteria, leading to a large number of negative imaging resulting in increased cost and radiation exposure. The sensitivity and specificity of radiographic imaging in detecting injuries in intoxicated blunt trauma patients are well studied, but there are limited data on the amount of negative or positive findings from radiographic images in intoxicated patients with minor trauma.8 Emergency physicians play a crucial role in identifying cervical spine injuries and preventing neurological damage. Additional investigation is necessary to further evaluate the incidence of clinically significant injuries when imaging intoxicated patients with minor blunt trauma. We aim to investigate the prevalence of positive imaging, the potential miss rate, the injury mechanism, demographics, and comorbidity of patients presenting with minor head or c-spine injury and intoxication and present this data in aggregate for all of the Cleveland Clinic Health System free standing and hospital based emergency departments.

Student responsibilities:
The student will be responsible for completing various components of the research process, including literature review, data abstraction, writing of results, and preparation of presentations/abstracts under the guidance of faculty members.

Clinical opportunities for the students:
The student will be expected to attend didactics and group lectures with resident physicians during their time at Cleveland Clinic Akron General and will be offered shadowing experience as physician schedules permit.

Project 11

Project Title:
Computational simulation of knee function related to patellar instability and surgical treatment

Specific skills/training/education required/desired:
BS in mechanical or biomedical engineering or a related field. Experience with Matlab, Excel, and computational 3D modeling a plus

Abstract of Research Plan:
Dynamic simulation of knee motion will be used to evaluate how a trochleoplasty procedure influences knee mechanics for knees with patellar instability. Computational models representing knees with patellar instability have already been constructed within a multibody dynamics simulation platform. These models will be utilized to simulate dynamic knee squatting. Algorithms will be developed and utilized to alter the shape of the trochlear groove to represent a trochleoplasty procedure. After simulation, the data will be run through algorithms to quantify the influence of the procedure on patellar kinematics and pressure applied to cartilage.

Student responsibilities:
The student will work with the computational models to perform the planned simulations. The student will run the models to simulate dynamic knee extension, and run the output data through the algorithms for quantifying knee kinematics and pressure applied to cartilage. The student will record all output data in a spreadsheet, and perform statistical analyses.

Clinical opportunities for the students:
Students can work with the orthopedic residents and staff member leading the project.