1. Tracy Madsen: “Prevalence and Treatment of Hypertension Among Patients with Suspected TIA/Stroke Admitted to an ED Clinical Observation Unit”.

Summary: Patients with transient ischemic attack (TIA) or minor stroke are at significant risk of having recurrent events in the days, weeks, and months following the incident event, and risk factor modification is critical to prevention of recurrent events. Hypertension is the most common modifiable stroke risk factor in the United States, and extensive literature has demonstrated disparities in prevalence and treatment of blood pressure control by race. In addition to disparities in the prevalence and control of hypertension by race, key sex and gender differences in hypertension have been described. These include sex differences in blood pressure trajectories over the life course, lower rates of blood pressure control in women compared with men in older age groups, and sex differences in the strength of association between stage 1 and 2 hypertension and stroke risk in large epidemiologic cohorts. Finally, patients with TIA or minor stroke are at risk of underdiagnosis or undertreatment of hypertension and thus risk of subsequent recurrent neurological events.

A large proportion of patients with TIA or minor stroke seen at Rhode Island Hospital are managed through our clinical decision unit (CDU) or rapid TIA pathway, a pathway in which patients may be discharged directly from the ED without an inpatient admission. Such expedited diagnostic and treatment pathways are common across the U.S. and may prevent the overutilization of resources such as inpatient hospital beds. With these new models, however, it is critical to ensure that rapid diagnostic pathways for TIA and minor stroke include standard of care treatment for hypertension and that patients with previously or newly diagnosed hypertension are treated according to current guidelines for secondary prevention of stroke.

Using data from the RIH TIA registry (from 2017 to 2022), we plan to conduct a retrospective cohort study to achieve the following objectives:

1) To describe the prevalence of hypertension among patients admitted to the RIH CDU for suspected TIA, overall and by age, sex, race, and ethnicity.
   a. To then elucidate the frequency of previously undiagnosed hypertension among patients admitted to the RIH CDU for suspected TIA, overall and by age, sex, race, and ethnicity.
   b. We will also describe the prevalence of hypertension by final diagnosis (TIA, stroke, or other diagnosis)

2) In a randomly sampled subset of patients with newly diagnosed hypertension or uncontrolled hypertension, to describe the management strategies for hypertension both during the ED or CDU stay and then after discharge.
   a. Description of management strategies will include: 1) whether new medications were prescribed; 2) whether current medications were adjusted; and 2) which provider the patients were instructed to follow-up with.
   b. Description of management strategies will be reported overall and by demographic groups based on age, sex, race, and ethnicity to provide preliminary data for future interventional studies.

The student will assist with chart review, data entry, data cleaning and management, and analysis.
2. Leo Kobayashi: “Internet-of-Things Augmentation of Public Access Naloxone Containers to Establish a Distributed Network for Resource Monitoring and Utilization Research (NaloxBox+).”

Summary: Dear SRA EM Program Directors:
I am committed to mentor and work with Joanne Liu, Brown University Sc.B. Biomedical Engineering candidate, Class of 2024 and PLME student Class of 2028 for a ten-week, full-time internship in the summer of 2023. I and my collaborator, Geoffrey Capraro, MD MPH, have spent time with Ms. Liu during her 2022 SRA EM with the NaloxBox+ project that drew upon and enhanced her engineering skills in the research, development, implementation, and testing of the novel Internet-of-Things (IoT) augmentation of community naloxone layperson rescue resources. Beyond the engineering challenges this project has presented, it is grounded in a pressing, real world topic—how opioid rescue tools are being used, and how technology can support adopters of the rescue tools. It offers the opportunity to examine how community organizations are using simple yet critical opioid overdose rescue tools. The project continues to implement, improve, expand, and study the IoT technologies to augment community organizations’ situational awareness, emergency preparedness, and support of emergency interventions.
During her second NaloxBox+ SRA-EM in summer 2023, Ms. Liu will be responsible for 1.) IoT datastream acquisition and analysis (using IoT pipeline, Microsoft Azure cloud resources, and SQL database), 2.) monitoring and analysis of NaloxBox+ opening event survey responses from end-user subjects, 3.) sustainment of installed devices (IoT pipeline from hardware to cloud), and 4.) compilation of data and analyses from both the 2022 SRA-EM and the 2023 SRA-EM to prepare a manuscript for peer-reviewed journal submission and academic conference presentation.
Ms. Liu's 2023 SRA-EM will not involve work in clinical spaces. All tools and equipment needed to execute this work are in hand and the Lifespan IRB has exempted the research program. Ms. Liu and I will meet in-person or via Zoom at least once weekly during the summer and will collaborate on all 4 project activities described above. Please contact me for any questions.

3. Joseph Pare: “AI-enabled algorithms for Rapid Ultrasound Detection of CHF”.

Summary: Over 5 million Americans have heart failure, and acute heart failure is the leading cause for hospitalizations for patients over the age of 65 years. Student will work with Dr. Pare to review patient charts, review clinical ultrasounds, and perform literature reviews to elucidate physiologic changes and targets related to acute heart failure. Ultrasound targets of interest include novel echocardiographic measures as well as pulmonary ultrasounds. Tasks will include chart reviews, learning to interpret clinical ultrasounds and obtain measurements, enter data results into REDCap, and data analysis. Work may occur at the Providence VA or Lifespan hospitals.
Research Subject Area: Emergency Care
Students should be interested in machine learning, image analysis and/or cardiopulmonary physiology and pathology. Prior experience in medical settings with access to and reading patient charts, working with data sets, data entry (REDCap), and image analysis are not required but preferred. Mentor will meet weekly with student in person either at RIH or VA, and throughout the week the mentor will be available by phone. Worksite will be either at Lifespan or the Providence VA.
4. Rebecca Karb: **Disparities in Prehospital and Acute Care of Patients with Ischemic Stroke in Rhode Island**

Summary: Stroke is a leading cause of death and disability in the United States. While preventative efforts to reduce cardiovascular risk factors and advances in acute stroke care have decreased overall stroke incidence and mortality over the past decade, racial and socioeconomic disparities persist. The goal of this comprehensive approach is to identify distinct areas of greatest disparity in order to inform future targeted, high-yield interventions to improve racial and geographic inequities in acute stroke care and outcomes in Rhode Island. The initial step in this study will be to identify relevant hospital and statewide data sources and build a comprehensive, geocoded prehospital through acute care data set of patients with ischemic stroke who presented to Rhode Island Hospital, Miriam Hospital, and Newport Hospital from October 2019 through October 2022.

The student will be primarily responsible for reviewing EMS records and patient charts and extracting relevant data on prehospital and inpatient stroke metrics. The student will also assist with analyzing the data and mapping racial and geographic disparities in stroke care across Rhode Island.

5. Mark Brady: **“Regional analgesia education initiative.”**

Summary: Regional pain blocks are underutilized in the emergency department to control pain and minimize opioid use. Barriers include the lack of emergency medicine specific educational initiatives and the lack of requirements for training. A handbook with associated videos and a web app have been created to help facilitate education. There are significant opportunities to contribute to the next steps in the larger initiative to make regional pain blocks part of the standard emergency medicine residency curriculum. The SRA-EM student will assist with the proposal and outline of a textbook to supplement the handbook and will have the option of assisting with the preparation of review articles intended to further the use of regional pain blocks, e.g., in international medical applications and in aerospace.

6. Susan Duffy: **“Implementing a Process for Routine Discharge Safety Planning of Patients at Risk for Suicide in a Pediatric Emergency Department.”**

Summary: We will be assessing Hasbro ED providers and RNs and their practices around discharge of patients at risk for suicide. The plan is to implement a standardized practice of reviewing a safety plan and doing lethal means restriction counseling. We are joining a national ED suicide collaborative, EMand this is the project we plan to take on.

7. Gregory Jay and Selim Suner: **“Hemoglobin Level Determination by an iPhone App”**

Summary: This is an ongoing investigation improving the accuracy of an investigational app to measure hemoglobin levels in emergency department patients. Images of the conjunctiva are collected and analyzed in real time at the bedside and later compared to a patient’s true hemoglobin value. Improvements in code are being iteratively created to improve accuracy and precision.
Summary: Sepsis is a leading cause of morbidity and mortality in children. Treatment guidelines emphasize early reversal of septic shock using antibiotics and titration of intravascular fluids (IVF) and vasoactive infusions. Clinicians currently lack precise patient assessment tools to optimize IVF and vasoactive therapies, particularly during the initial Emergency Department (ED) resuscitation when IVF repletion must be balanced with the risk of fluid overload. Point-of-care ultrasound (POCUS) is a promising tool to help guide pediatric sepsis resuscitation by evaluating cardiac function, intravascular volume status, and the presence of pulmonary edema. Definitive studies are necessary to determine how POCUS can be optimally integrated into the initial ED care of children with sepsis.

Our objective is to develop a standardized POCUS protocol to evaluate children with sepsis and understand how clinicians use POCUS for clinical decision-making for these patients. Part 1 of this project will be a consensus study to develop a POCUS protocol. We will identify 20 POCUS experts to participate in a modified Delphi process to create a multiorgan POCUS protocol for children with sepsis in the ED. Part 2 of this project will prospectively pilot this protocol on patients. We will enroll a convenience sample of children with suspected sepsis in the ED when a POCUS-trained provider is available. We will determine feasibility of completing the protocol including completeness, accuracy of interpretations, time to complete the scanning protocol, and barriers to completion. We will also assess its impact on clinical decision-making. POCUS data will be incorporated into clinical care per the treating provider’s clinical discretion. Providers will be surveyed on how POCUS findings impacted clinical care, including decisions about IVF volume, vasoactive medications, timeliness of care, and patient disposition.

Student Responsibilities: Student will assist with the Delphi process and prospective enrollment of patients. For the Delphi study (part 1), the student will be primarily responsible for administrative conduct of the study including contacting participants, obtaining consent, following up on incomplete surveys, scheduling meetings, collecting and entering data, IRB management, and helping facilitate focus groups discussions. Part 1 will likely start before the summer project time begins but the student may participate at any point in the study. For the prospective enrollment (part 2), the student will be responsible for screening for prospective patients in the ED, contacting the ultrasound-trained providers to perform the study ultrasound, consenting patients, administering surveys, and entering and managing data and creating a database of images for blinded review. Optional for student to be trained on the point-of-care ultrasound protocol if they are interested in hands-on participation in the study and are able to achieve proficiency in ultrasound skills. The student will meet weekly with the study PI either by Zoom or in person and should expect to communicate more frequently by email, phone, or text.

Desired qualifications: Organizational skills, attention to detail, good communication, especially by email and text, will be key for this SRA. As the majority of pediatric ED patients are seen in the afternoon and evening, we prefer a student who is willing to work some afternoon to evening shifts to enroll patients, however the schedule is flexible and can be tailored to the student. Experience with REDCap, survey design, other data management, consent in studies, and point-of-care ultrasound are ideal but certainly not required.