Summer Student Research Program
Project Description

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PROJECT TITLE (200 Characters max):

Health Equity in the Emergency Trauma Care: Analysis of Disparities in the Pre-Hospital Emergency Trauma Care System

HYPOTHESIS:

Socio-spatial disparities are prevalent in the expeditious availability to EMS and access to trauma centers among critically injured trauma patients,

PROJECT DESCRIPTION **(Include design, methodology, data collection, techniques, data analysis to be employed and evaluation and interpretation methodology)**

Trauma is the leading cause of death for children and adults 46 years and younger, killing more Americans than AIDS and stroke combined. African Americans (OR 1.2, P<0.001), people living in high poverty neighborhoods (OR 1.01, P<0.001), and those enrolled in public health insurance programs (OR 1.53, P<0.001) have increased mortality after trauma when compared to their injured counterparts. Quantifying the equity in access to Emergency Medical Services (EMS) and designated/verified trauma centers (TCs), as well as the extent to which timely access to care improves health outcomes are critical first steps to address this alarming discrepancy. Equitable availability to EMS has yet to be evaluated and equitable access to TCs is understudied. In fact, no one has explored the importance of expeditious availability to emergency health care services such as EMS and timely access to emergent trauma care as key social determinants of health (SDOH). Models to evaluate the role of SDOH as major predictors of these disparities remain untested. Rapid transport to a TC is associated with a 25% reduction in mortality; however, nearly 45 million Americans lack timely access to a verified TC. When compared to white populations, recent data show racial/ethnic minority populations have significantly less access to TC and worse outcomes following trauma. Understanding the factors that determine trauma-related socio-spatial disparities can inform interventions at both the policy and system levels to mitigate the disproportionately large numbers of deaths experienced by minoritized populations. Thus, there is a compelling need for research in these areas to facilitate targeted interventions to eliminate socio-spatial disparities within the pre-hospital phase of the emergency trauma care system to improve patient outcomes. To evaluate socio-spatial disparities in availability and access to both EMS and to TCs among critically injured trauma patients, we will apply the Health Equity Measurable Framework (HEMF) to the pre-hospital phase of the emergency trauma care system (availability to EMS, EMS response time, EMS scene time, EMS transportation time, EMS decision to transport to TCs vs. non-TCs, and EMS total prehospital time) and use large national databases to develop spatiotemporal models to assess drivers of disparities in traumatic injuries. HEMF will be particularly well suited for our proposed study because it is designed to describe SDOH in a causal framework to guide the quantitative analysis of health equity for ongoing pre-hospital trauma care surveillance of the critically injured and subsequent policy development. Our interdisciplinary team will use data science methods and novel analytics to address this critical public health need by identifying health disparities at the level of the pre-hospital emergency trauma care system.

SPONSOR'S MOST RECENT PUBLICATIONS RELEVANT TO THIS RESEARCH:

Berry, C; Escobar, N; Mann, C; DiMaggio, C; Pfaff, A; Duncan, D; Frangos, S; Jakka, R; Ogedegbe, O; Wei, R; Ambulance Deserts and Inequities in Access to EMS Care in the United States: Are Patients within Socioeconomically Disadvantaged Areas at an Increased Risk for Delays in Prehospital Care? *Journal of Trauma and Acute Care Surgery*, 2025 (in press)

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THIS PROJECT IS: ☒**Clinical** ☐**Laboratory** ☐ **Behavioral** ☐ **Other**

THIS PROJECT IS CANCER-RELATED☐
Please explain Cancer relevance

THIS PROJECT IS HEART, LUNG & BLOOD- RELATED☐
Please explain Heart, Lung, Blood relevance

THIS PROJECT INVOLVE RADIOISOTOPES?☐

THIS PROJECT INVOLVES THE USE OF ANIMALS ☐
PENDING ☐ **APPROVED** ☐ **IACUC PROTOCOL #**

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS? ☐
PENDING ☐ **APPROVED** ☐ **IRB PROTOCOL # M**

THIS PROJECT IS SUITABLE FOR:

UNDERGRADUATE STUDENTS	☐	ENTERING FRESHMAN	☐
SOPHMORES	☐	ALL STUDENTS	☒

THIS PROJECT IS WORK-STUDY: **Yes** ☐ **or** **No** ☒

THIS PROJECT WILL BE POSTED DURING ACADEMIC YEAR
FOR INTERESTED VOLUNTEERS: **Yes** ☐ **or** **No** ☒

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?
Students will gain knowledge of the impact of expeditious access to EMS care and definitive care at a verified trauma center on patient outcomes among critically injured patients. Students will gain experience in large national database analysis, geospatial analysis, the impact of sociospatial injustice on outcomes among critically injured patients, writing of scientific abstracts, writing of scientific manuscripts, creating PowerPoint presentations to present research findings, and will begin exploring strategies on the translation of our research findings towards changing health policy to ultimately impact marginalized populations.