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Utilizing AI to Optimize EMS Response to Acute Mental Illness and Resulting ER Resource Allocation

Typically, emergency medical technicians are not equipped to handle mental health calls. This deficiency often necessitates transport of these patients to emergency departments, straining public health resources and potentially diverting ambulances from trauma-related emergencies. This study aims to develop a predictive model capable of accurately categorizing the nature of incoming emergency medical services (EMS) calls to facilitate a more nuanced response. This research also highlights the ineffective admission of patients with mental health crises to EDs, often at public expense, when other treatment is more appropriate. The policy proposal is to staff EMS crews with social workers when the predictive algorithm identifies such calls.

After a retrospective study of related AI projects, the model was established with 24 million patient interactions from NYC's EMS Incident Dispatch Data collected Jan 2005 to Mar 2022 and validated with additional data from Apr-Dec 2022. Class-imbalance methodology and gradient boosting strategies were used to train and test the model. The model achieved 94.5% predictability, compared to 92.3% accuracy for EMS operators. With 9 million NYC 911 calls annually, the algorithm could more effectively allocate resources in 198,000 cases. Staffing EMS crews with social

workers could reduce ER visits and ambulance transfers—with \$5.6 billion spent in the U.S. annually on mental and substance use disorder ER visits—resulting in \$123 million savings.

Presentation Theme: Emergency Medical Care/Mental Health Response

Collaborators, Advisor(s) and Department(s) that assisted with this research: Dr. Melodie Ting