



Presentation Title: Tempe Fire Medical Rescue Patient Advocate Services

Presented by: Dana Cardenas, EMS Coordinator/Patient Advocate Services Director Tempe Fire Medical Rescue

I. Formative Evaluation – Planning

Tempe Fire Medical Rescue is the primary EMS provider for Tempe, and like many cities, it has its share of frequent 911 utilizers. In a city of 180,000 people, four individuals accounted for 1 percent of all EMS incidents in 2017. The overwhelming majority of their calls were non-emergent.

Non-emergent EMS calls are a strain on the city, insurance, and healthcare providers. Most importantly, frequent utilization of 911 indicates a patient has unmet medical needs. Patients commonly fall through the gaps in our health care system, leaving first responders in the difficult position of dealing with chronic health issues they are ill-equipped or trained to treat. In response, Tempe Fire Medical Rescue created a community paramedicine program, Patient Advocate Services (PAS), to fill those gaps.

The mission of Patient Advocate Services is to improve the life and health of Tempe residents by providing coordination of medical care and accessibility to social determinants of health. In contrast to community care programs with dispatched units, PAS uses a community coordination of care model that focuses on connecting patients to a primary care provider and other social and medical services. Additionally, the program uses an innovative use of predictive analytics on EMS data to identify patients in need.

II. Process Evaluation – Implementation

The program has evolved significantly over the last five years. The current team consists of an RN, an EMT, a part-time NP and a data analyst. Documentation of all patient encounters and contacts reside in an extensive self-developed community health module in the records management system, separate from the department's EMS workflow.

Department medical staff take patient referrals from crews, hospital staff, and community members. After an initial consultation, a comprehensive needs assessment is made, which includes an assessment of the patient's social determinants of health. PAS then coordinates with hospital systems, home-based medical services, families, city and state agencies, and behavioral health care teams. Common partners include the Senior Adult Independent Living Program, the Veterans Administration, Tempe's Homeless Outreach Prevention Effort, Tempe's behavioral and crisis response team Care 7, and hospital caseworkers.

The most recent modification to the program's workflow involves predictive analytics. Our data analyst has built a predictive model for assessing the likelihood an EMS patient will have another incident within 30 days. Every EMS incident by Tempe Fire Medical Rescue is analyzed by a mixture of machine learning models to determine the probability of a repeat incident. A daily report generates a

list of patients and the necessary information. Using these reports, our medical staff assesses each patient and determines what kinds of interventions and resources potentially to provide.

While crews are still encouraged to submit referrals to our program, the automated referrals allow PAS to identify a patient in need without depending on crews in the field to notice a trend in calls. Since the model's introduction, PAS has helped otherwise overlooked patients.

Additionally, the processing of each call helps PAS keep tabs on the program's patients. Previously, to learn that a current PAS patient had a recent incident, crews would have to recognize a patient as enrolled in PAS and then alert staff. Inevitably, patients would fall through the cracks. Now, the automated process flags all calls by PAS patients for staff consideration.

III. Impact Evaluation – Short-Term Results

In our current data system going back to 2016, we have formally enrolled 172 patients. Many more patients received services without going through formal enrollment. The program has made over 2,000 documented contacts with patients or on their behalf.

IV. Outcome Evaluation – Long-Term Results

Based on comparisons between EMS incidents for enrolled patients six months before enrollment and six months after enrollment (excluding a one-month transition period after enrollment), our data shows a 50% reduction in EMS incidents for our 110 patients with sufficient data to analyze.

Preliminary analysis of our data by a health economist at the University of Arizona shows potential savings to patients:

Potential savings associated with EMS incidents during the first six months of Tempe PAS enrollment	
Total enrollment	110
Number of Transports and ED Visits avoided(1)	121
Average cost of ambulance transport(2)	\$600
Average cost of ED visit(3)	\$749
Potential savings from ambulance transports avoided	\$72,600
Potential savings from ED visits avoided	\$90,629
Total potential savings	\$163,229
Potential savings per patient enrolled	\$1,484

(1)Based on comparison between EMS incidents for enrolled patients six months before enrollment and six months after enrollment, excluding a month transition period after PAS enrollment. Assumes that every EMS incident results in ambulance transport and ED visit.

(2)Based on the Tempe area EMS data.

(3)Based on mean Medicare reimbursement for ED visits.