Program Title: The Untapped Resource: A Successful Model Using Medication Experts for Chronic Disease Risk Reduction

I. Formative Evaluation – Planning

From 2008-2015, utilization of emergency medical services for patients with a poorly controlled chronic disease increased by 37%, with 69% of 911 calls involving chronic care non-emergencies by 2015. Contributing socioeconomic factors: Manatee County, FL, is federally designated as a Medically Underserved Area, a Primary Care Physician Shortage Area, and 44% of households fall below the poverty level. Top causes of death in Manatee were analyzed, along with 911 indicators. Heart disease, injury, COPD, stroke, diabetes, and suicide all ranked in the top ten. Simultaneously, Manatee battled the opioid epidemic, with some of the highest death rates in Florida.

Hospital readmission rates for heart failure, and COPD reflected 19- 22%, with 50-60% of heart failure patients not taking their medications or taking them incorrectly. In addition, national data show 20% of patients will have an adverse event post-hospital discharge, with most events related to or caused by medications, and 100% of patients with multiple transitions of care suffering a medication error. Lastly, evidence shows incorporating a pharmacist for post-hospital discharge medication review identified medication discrepancies in over 80% of patients and reduced hospital readmission rates at 7, 14, 30, and 60 days.

Secondary to these challenges, the Community Paramedicine Program addresses healthcare gaps, eliminates healthcare access barriers, increases health equity by improving health outcomes among the medically vulnerable, reduces overall healthcare costs, and prevents health-system overutilization by reducing 911 calls, ER visits, and hospitalizations.

II. Process Evaluation – Implementation

This program merges the Community Paramedicine Program with a Pharmacist to visit patients discharged from the hospital for qualifying conditions to review medications and their discharge instructions.

Program Enrollment Categories:

Mental Health or Substance Use Disorder	Chronic Cardiovascular or Respiratory Disease	Diabetes Mellitus	Frequent Falls	High System Utilizer (3+ 911 calls/ 30 days)

Staffing for the program comprises one Chief, two Full-time Community Paramedics (CP), one Pharmacist, one Coordinator. Community Paramedics (CP) staffing is seven days per week from 9 A.M. until 7 P.M. A CP working a full day schedules visits with High-Risk Patients. A CP with a half-day schedule makes unscheduled visits, allowing flexibility for new patients and patient emergencies.

The program first gained access to the Health Information Exchange for local hospital discharge data using ESO and Zoll. However, they were inadequate to meet the program needs due to insufficient data and metrics tracking and remote patient monitoring needs, so HealthCall was implemented.

Initially, a pharmacist visited each patient alongside a paramedic in the home. However, as the patient load grew, the pharmacist consult was done remotely, indicating the feasibility of incorporating pharmacists with telehealth approaches.

Referrals to the program come from any healthcare provider or community partner. A pharmacist review must meet the following scenarios:

1) Acute disease exacerbation: Pharmacist consulted to determine if outpatient medication could resolve the acute issue; the pharmacist or CP would facilitate communication with the patient's physician
2) Meeting one of the following inclusion criteria:

Polypharmacy (4 or more medications)	Uncontrolled Diabetes, Hypertension, Heart Failure, COPD, others	Multiple prescribers
Dialysis or Chronic Kidney Disease (CKD)	Medication Cost/Affordability Issues	HIV/HEP C Positive
Post-discharge heart failure or post-myocardial infarction	Frequent Falls or history of hip/vertebral fracture	Abnormal Lab Values

There have been 711 medication interventions for 145 patients during the first three years.

Program Implementation Cost for three years, including all salaries, vehicles, equipment, etc., was $1,943,984 ($604,867 in Year 1, $645,368 in Year 2, $693,749 in Year 3). Three years of research, data analysis, and result distribution to stakeholders is about another $36,000.

III. Impact Evaluation – Short-Term Results

To explore pharmacist impact on hospitalizations avoided, a subset analysis of heart failure patients enrolled in the program over one year was done. Hospitalization data were collected from the six months before enrollment and compared to hospitalization data from the six months after program enrollment.

- 94% of heart failure patients had pharmacist intervention & medication changes
- 88.2% reduction in hospital admissions (17 admissions in 6 months prior vs. 2 in 6 months after)
- 90.1% reduction in # of days hospitalized (102 days in the 6 months prior vs. 10 days in 6 months after)

IV. Outcome Evaluation – Long-Term Results

For every $1 spent on program implementation, the program saves $4.02, totaling over $5 million in 3 years.

	Year 1	Year 2	Year 3	Total Savings ($)
Diverted Ambulances	380	489	428	$342,994 -$3,374,782*
ED Visits Avoided	309	396	300	$1,915,590
Hospitalizations Avoided	180 over 3 years			$4,043,969
Adverse Drug Events Prevented	313			$60,409-$2,954,720**
Med Nonadherence Corrected	253			$3,082,265

*Range reflective of CMS payment averages nationwide
**Significant range due to variability in the severity of adverse drug events

The analysis finds substantial benefits to establishing paramedic-pharmacist partnerships as a solution to chronic disease risk reduction, and medication experts are an untapped resource in the area of CRR. Additionally, this analysis was done from a payer perspective – opening the door for payers like CMS to compensate MIH, Paramedicine, and CRR teams for the costs they reduce in communities.