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Problem Statement: SI PPS is an alliance of clinical and social service providers focused on improving the quality of care and health for Staten Island's 180,000+ Medicaid and uninsured residents. Opioid overdose continues to pose a serious risk, with many preventable deaths each year. Most interventions are deployed after an overdose (OD) has occurred. Using a sophisticated and multifaceted database, SI PPS and MIT Sloan researchers have developed an algorithm to enable interventions before an overdose occurs. We want an H-Lab team to develop a testing and implementation process for this algorithm that is both cost effective and practical for use with an at-risk population who have never overdosed, as well as those in recovery who are still at risk.

Predictive Model

MIT-based researchers have an ongoing relationship to develop predictive models, identifying individuals at risk of opioid overdose, for SI PPS.

- 50% of overdoses could be predicted by isolating just 10% of the highest-risk individuals through the model¹
- An implementable model must categorize the served population into risk categories, by level and source of risk – a key to effective intervention
- Intervention must come from the partner with the right relationship, capabilities, and capacity

Sources: 1 - Neal Kaw Summer 2020 Research Progress Update

Objectives

1. Partner Analysis
2. Process Flow Diagram and Analysis
3. Cost Benefit
4. Pilot Design

Research

Opioid abuse has links to:

- Prescription abuse²
- Association with social determinants of health (SDOH) and related disparities²
- Other comorbidities, such as mental health disorders and chronic pain³
- Genetic susceptibility⁴

Predictive models do exist for classification and prediction of opioid related harm, but no effective prognosis tools exist

Source 2 - Sproule B., Brands B., Li S., et al., Changing patterns in opioid addiction, Can Fam Physician 2009;55:68-9.
Source 3 - Salsitz, E.A., Chronic Pain, Chronic Opioid Addiction: a Complex Nexus, J. Med. Toxicol. 12, 54-57 (2016)
Source 4 - Kendler, K.S., Jacobson, K.C., Prescott, C.A., Neale, M.C. Specificity of genetic and environmental risk factors for use and abuse/dependence of cannabis, cocaine, hallucinogens, sedatives, stimulants, and opiates in male twins. Am. J. Psychiatry 2003, 160, 687-695.

Partner Network Analysis

Constraints in treating at-risk patients:

- Lack of a seamless provider interface
- Inadequate medication assisted treatment access points

Info constraints in assessing risk:

Lack of universal access to Health Information Exchange which could provide:

- Access to care by prior treating providers
- Access to social determinants of health
- Alerts related to change in patient's risk factors
- Other pertinent information not provided by the patient

Predictive System Benefits:

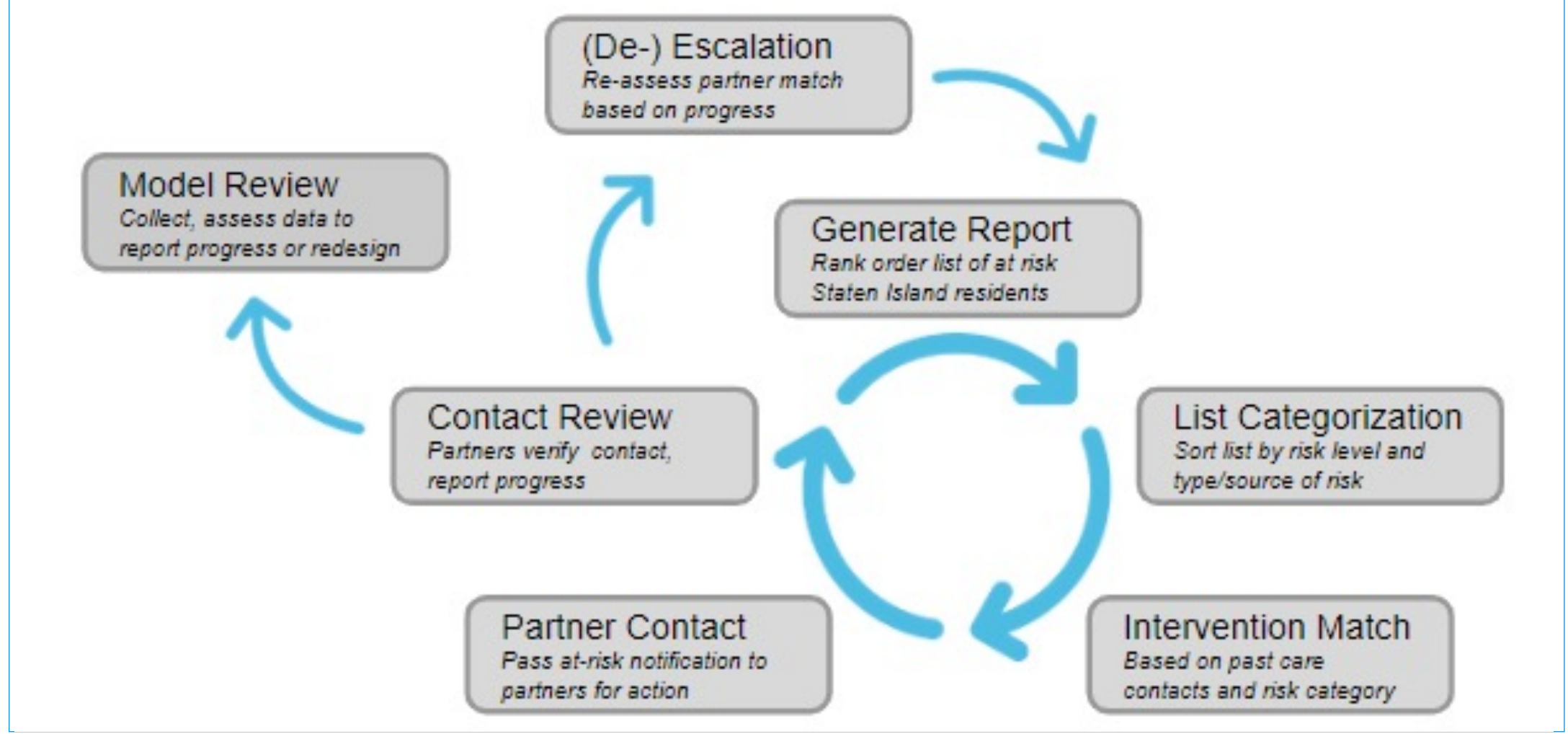
- Prioritization of high-risk patient follow-up
- Early intervention for those transitioning from justice involved settings
- Reduction in OD and mortality

Project Summary

Opioid overdose continues as one of the most serious risks to the American population, with over 70,000 preventable deaths per year. Most interventions are deployed after an overdose (OD) has occurred. Using a sophisticated and multifaceted database, sourcing from electronic health records (EHRs), the Staten Island Performing Provider System (SI PPS), in collaboration with MIT Sloan researchers, have developed an algorithm that would rank Staten Island residents on the likelihood to overdose or abuse opioids and seek to enable interventions before an overdose occurs.

Our H-Lab team has created a process flow for identified high and medium risk patients to assign them intervention with SI PPS partners. Continuous improvement process flows will also be suggested with potential hurdles to encounter. An implementation and test plan for a tabletop simulations, manual process, and automated process pilots will be provided to the SI PPS team. The tabletop dry-run was run with the SI PPS team as well as partners within their network. In addition, through research and interviews, the team shall provide an analysis of the partners' capabilities and capacities on the island. The team will also provide feedback to the MIT research team of learnings about the SI PPS and their partner's thoughts and concerns for the model as it is being developed. A cost-benefit analysis will be conducted to understand the financial implications of implementing this process in the SI PPS system. The team is providing the required items for the implementation of the process at SI PPS.

Process Flow Diagram



Pilot Design

- 1. "Dry Run"**
 - 3-hour workshop with SIPPS and partners
 - Clarify process, roles, responsibilities, and identify exceptions
 - Require 2 - 3 risk reports and access to database
- 2. Manual Process**
 - 3 month pilot with limited partners and manual intervention matching
 - Test process, intervention matching, and partner outreach on a small scale
 - Require monthly risk reports, SIPPS capacity for intervention matching, and partner capacity for outreach
- 3. Automated Process**
 - 12 - 18 month pilot with all partners and automated notification process.
 - Evaluate impact of preventative intervention based on analytics model
 - Require updated model implementation, EHR & HIE integration, and regulatory changes to allow Opioid clinical notifications.

Tabletop Dry Run

- To generate understanding of process and motivations, we facilitated two tabletop exercises.
- Found important information justifying inter-partner coordination, model interpretability, and complexity of intervention matching.

Cost Benefit

SIPPS Cost/Benefit for VBP				
Medicaid Avg Cost ¹ :	\$18,891			
# SIPPS Patients	500			
VBP Cycle	18-24 Months			
	Individual w/ No Intervention			Individual w/ Intervention
	Low	Medium	High	
% Cost Reduction ²	15%	15%	15%	
Total Cost	\$32,115	\$64,229	\$96,344	
Delta Per Patient	\$5,667	\$11,335	\$17,002	
Total Savings	\$2,833,650	\$5,667,300	\$8,500,950	

¹ National estimate of adjusted, mean, per-event charges (https://pubmed.ncbi.nlm.nih.gov/23879214/)
² Medical costs decreased by 30 percent on average between the year prior to MAT and the third year following treatment, and these cost trends reflect a decline in expenditures in all types of health care settings (https://www.medicaid.gov/medicaid/benefits/behavioral-health-services/substance-use-disorders/index.html) (https://idi.upenn.edu/sites/default/files/pdf/LDI_CHERISH_Brief_final.pdf)

Recommendations

- Implementation of process flow
- Call center for inter-partner coordination
- Semi-autonomous intervention matching
- Model Interpretability
- Value Based Payment Adaptations
- Integration with Health Information Exchange