Utilizing Social Determinants of Health to Improve Clinical Quality and Outcomes

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Dallas, TX

September 2016

Corporate History & Background

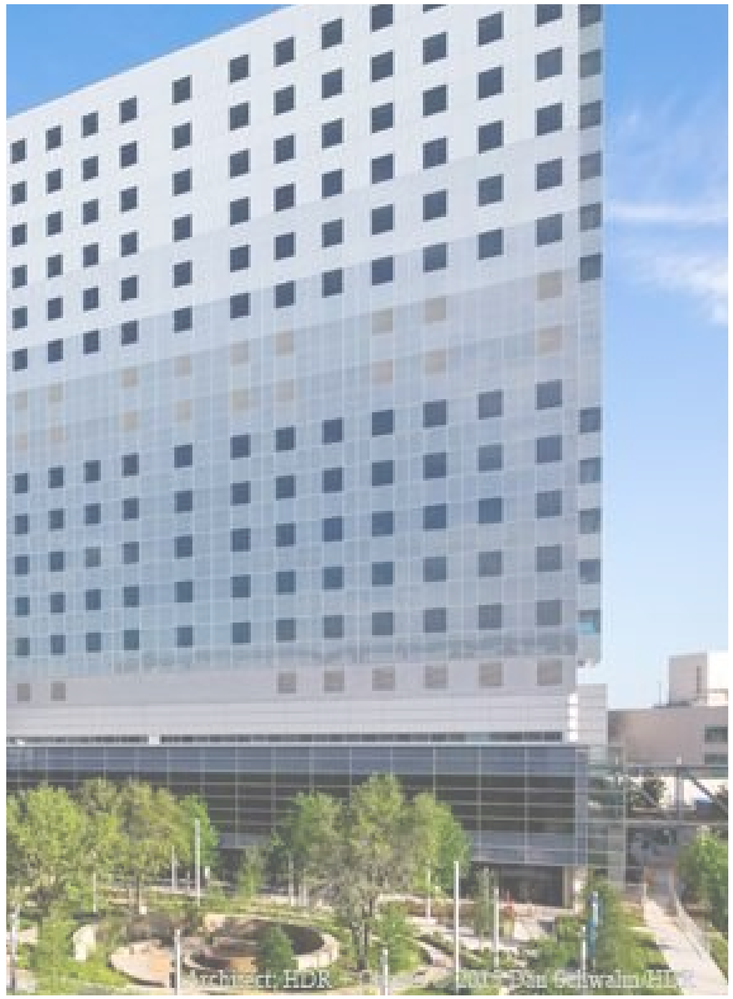
pcci

- **Structure:** Non-Profit, 501c(3)
- **Mission:** To re-imagine and expand the knowledge-base of healthcare delivery in the age of machines.
- **Business Definition:** We use scientific research and applied analytics to improve the quality, efficiency and experience of health care, at Parkland and beyond.

PIECES TECHNOLOGIES INC.

- **Structure:** For-Profit, Commercial Spin-Out of PCCI
- **Mission:** To advance health at every decision.
- **Business Definition:** We provide integrated monitoring, prediction, workflow optimization, and organizational learning services and software for hospitals, health systems, and community based organizations.

Early Outcomes



Client Overview

Community public health system
> 1 million patient visits a year

Challenges

Lack of clinical decision support
Lost revenue due to missed gaps
High readmission rates

The Results

Cut readmission rate by **31%**

Estimated savings of **$1.1M** with no increase in staffing

Penalty avoidance to-date is **$9M**

The factors that affect clinical outcomes. How do we identify them in real-time?

ADAPTED FROM MCGINNIS ET AL., 2002
From: “Leveraging the Social Determinants of Health: What Works?”
Yale Global Health Leadership Institute, BCBS Foundation MA, June 2015

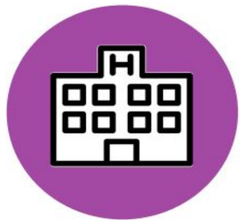
Community Based Organizations (CBOs) address many health-related social needs...

CBOs

Core Needs	Supplemental Needs
• Food Insecurity	• Family & Social Supports
• Housing and Utilities	• Education
• Food Insecurity	• Employment & Income
• Crisis and Emergency	• Health Behaviors
• Interpersonal Violence	• Legal
• Transportation	• Senior Services

..but CBOs are often fragmented, disconnected, under-capitalized and over-looked.

CBOs



Hospitals

Transitional Care

Behavioral Health

How do we align, connect, and integrate across social and health sectors within communities?

Observed Challenges with CBOs

- Numerous and diverse
- Fragmented landscape
- Crude infrastructure (paper, excel, access database records)
- Limited IT Staff
- Difficulty reporting outcomes
- Difficulty recording outputs
- Lack of understanding of client needs
- Limited understanding of other organizations serving same clients
- No standardized way to connect to other orgs
- Volunteer base leads to inconsistent workflow

Our Approach to Cross Sector Sharing of Social Determinants

1. Shared Technology Platform
2. Community Alliances
3. Governance Structure
4. Care coordination
5. Political Will

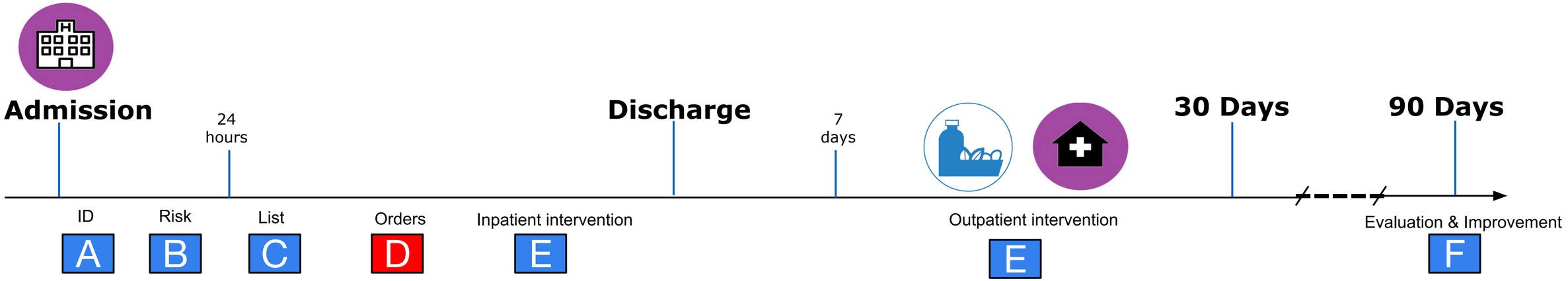
1. Shared Technology Platform is Vital

Key Functionality

1. Decision Support for risk cohorting
2. NLP to mine social determinants from notes
3. E-referrals to CBOs with closed loop feedback

1. Case Management software to receive referrals and perform assessments
2. Community resource directory enroll into social service programs

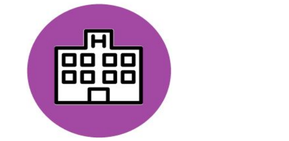
Social Determinants Help Guide a Patient's Journey



Decision Support Platform

EMR

How Rapidly Can You ID Risk Factors?



Admission

ID

A

- **CHF**
- Diabetes
- Falls
- Homelessness
- Substance Abuse
- Social Factors

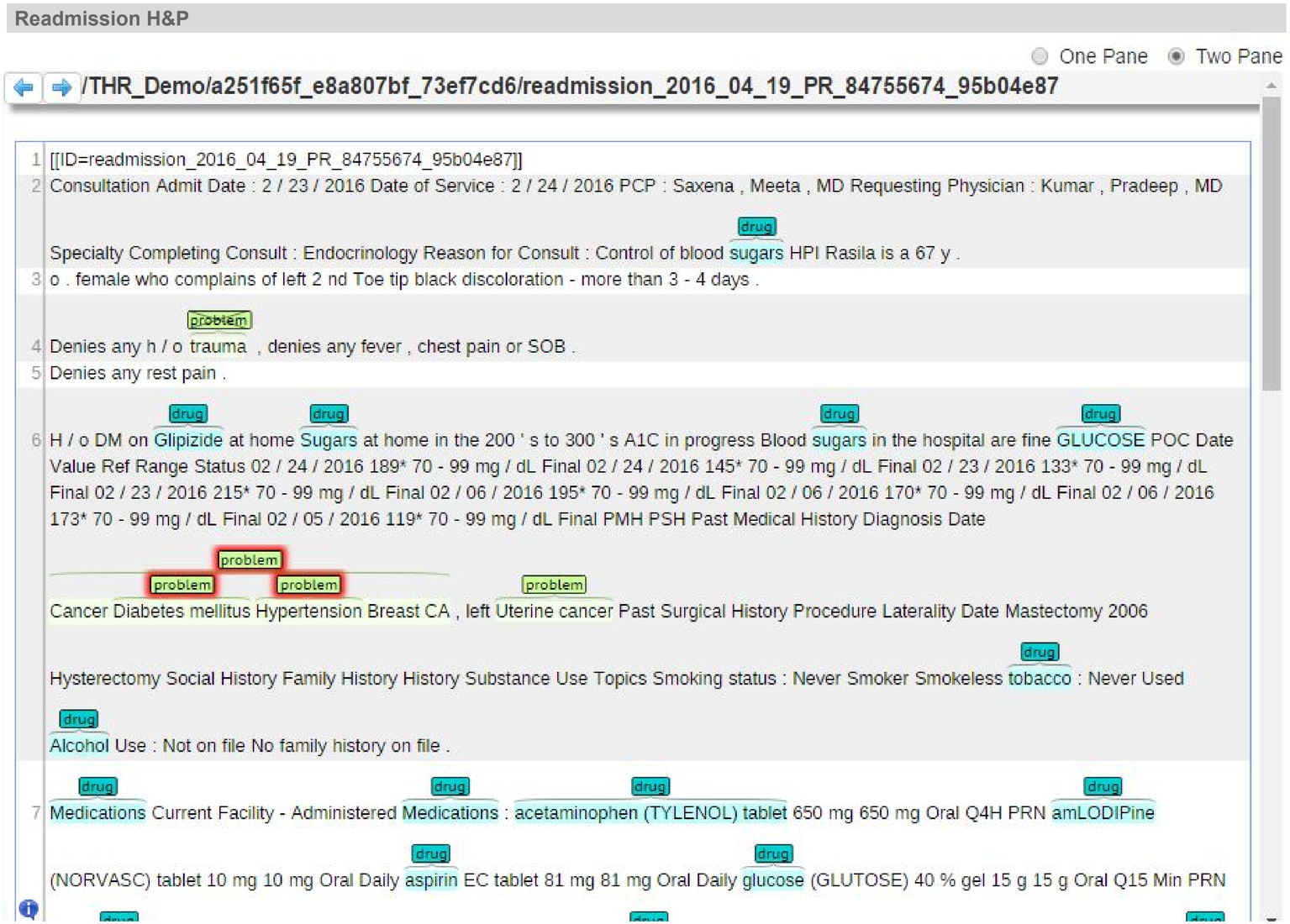
Novel technology like Natural Language Processing helps identify social determinants in complex physician notes:

- Homelessness
- Substance abuse
- Behavioral health issues
- Social support
- Financial and job insecurity
- Address changes (personal chaos)
- etc.

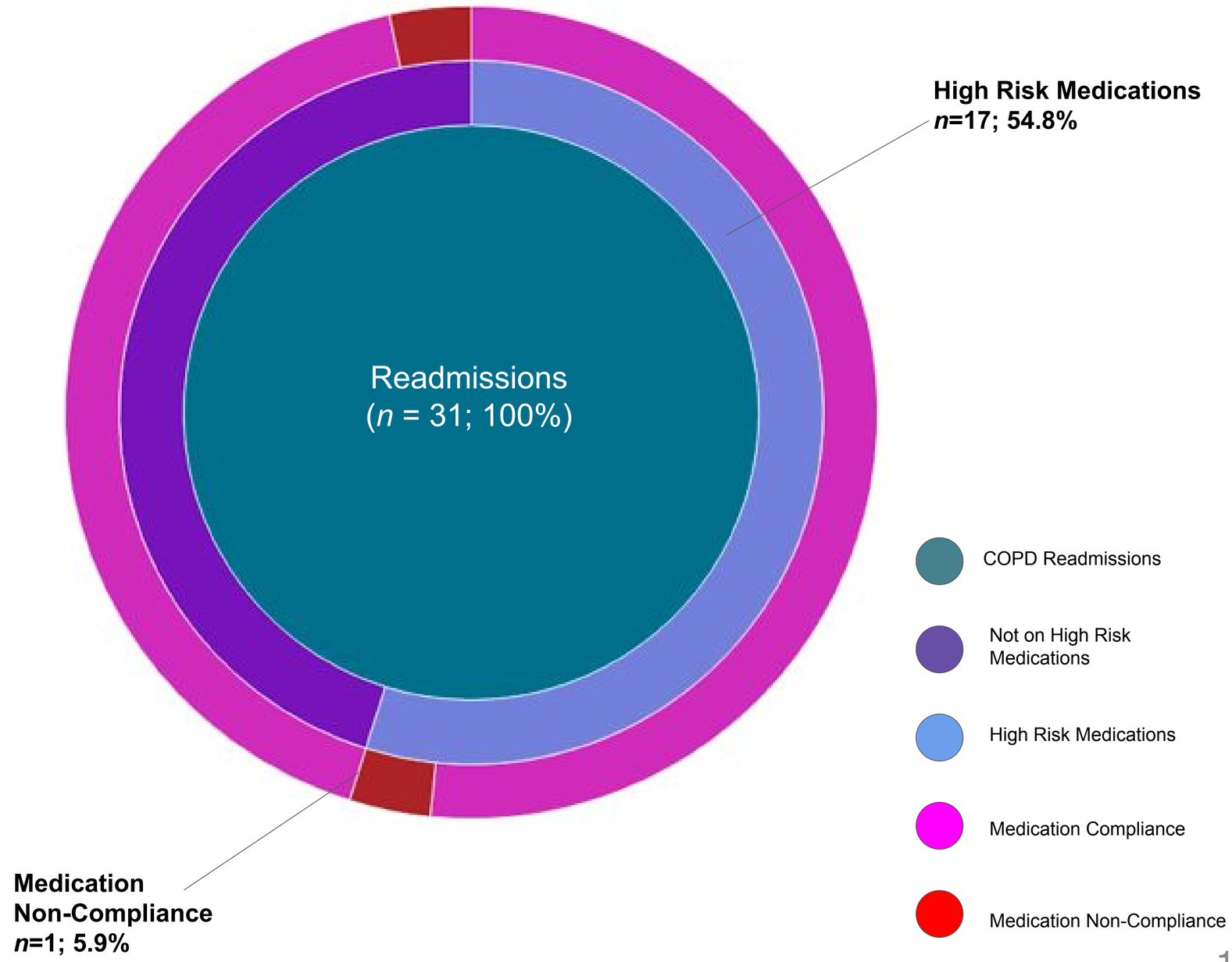
Analytic Solution

EMR

Example of Highlighted Note Using NLP



Rapid ID of Medication Non-Compliance in Readmitted Patients



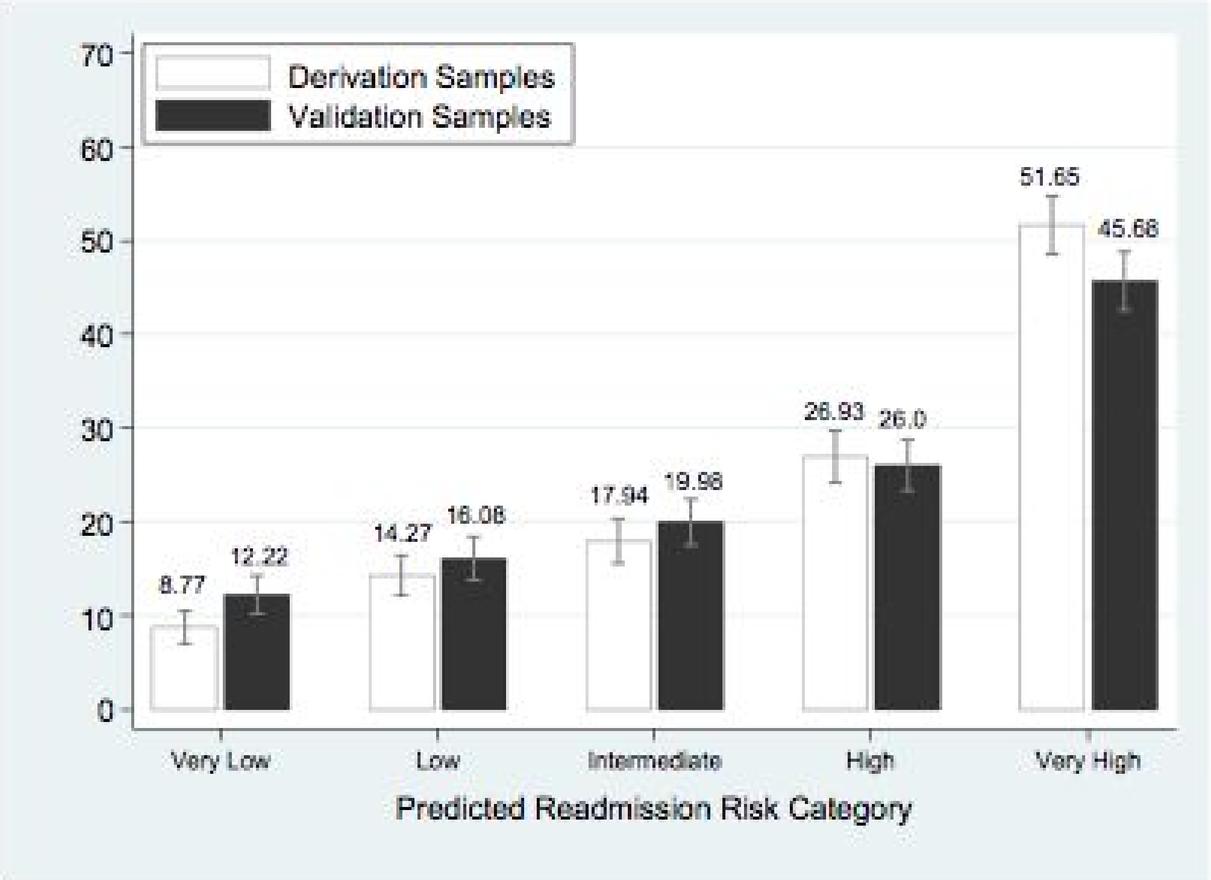
Defining Subpopulations based on Risk Factors

Admission

ID Risk

A B

- **Phenotype the risk**



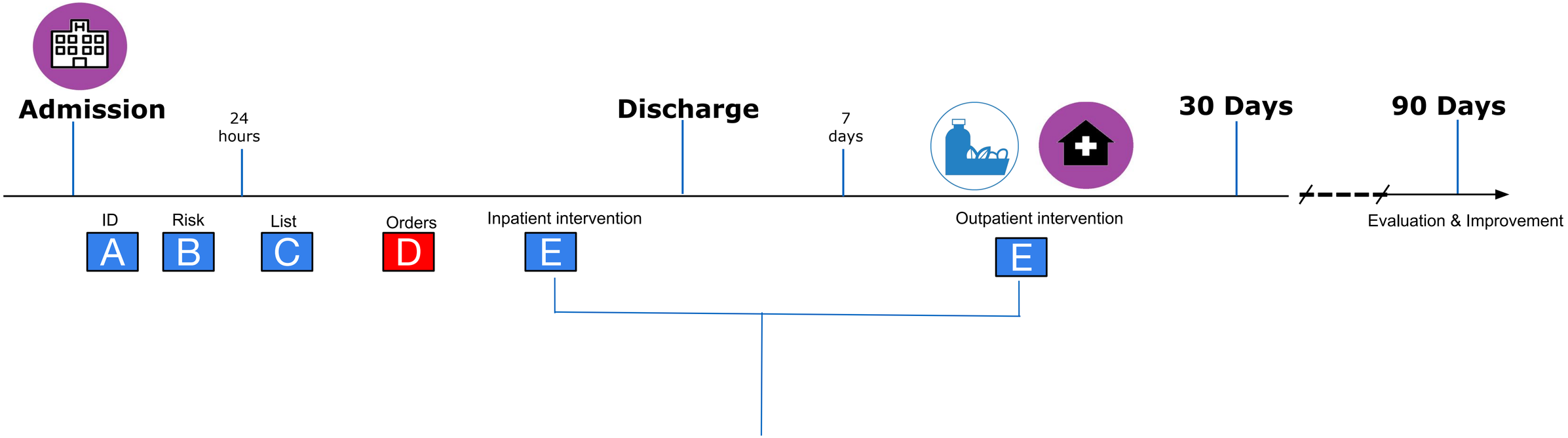
Amarasingham et al, Medical Care, 2010

Social determinant risk factors should augment clinical risk factors

Decision Support Platform

EMR

Matching Intervention to Risk is the Hardest Problem

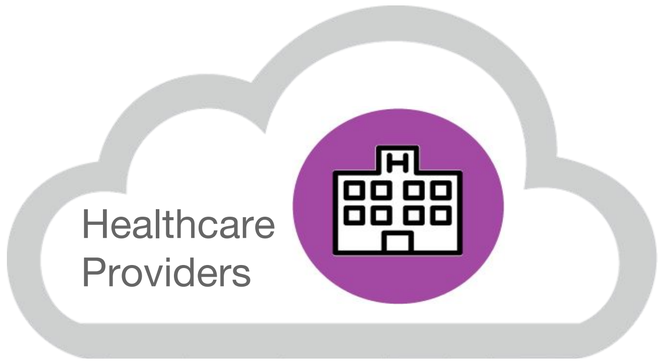


- **Intervention and Monitoring within workflow**

Decision Support Platform

EMR

2. Community Alliances | Dallas Information Exchange Portal



Secure Sharing of Social Determinant Data

Parkland

BaylorScott&White HEALTH

Methodist HEALTH SYSTEM

children's MEDICAL CENTER

Metrocare SERVICES

North Texas Food Bank

MDHA METRO DALLAS HOMELESS ALLIANCE

MOSAIC FAMILY SERVICES

HOUSINGCRISISCENTER

ARED HOUSING CENTER, INC.

THE BRIDGE

THE STEWPOT

NEXUS RECOVERY CENTER INC

PROMISE HOUSE PROMISING YOUTH. PROMISING FUTURES.

Austin Street Center

our community pantry a Program of the North Texas Food Bank

FAMILY ENDEAVORS BELIEVE • BELONG • BECOME

LEGACY

the family place

CitySquare

INTERFAITH HOUSING COALITION Transitional. Transformative. True Solutions for Homelessness.

Key Features for Connecting Healthcare Providers with Social Services

Closed Loop Referrals

Patients & clients won't fall through the cracks

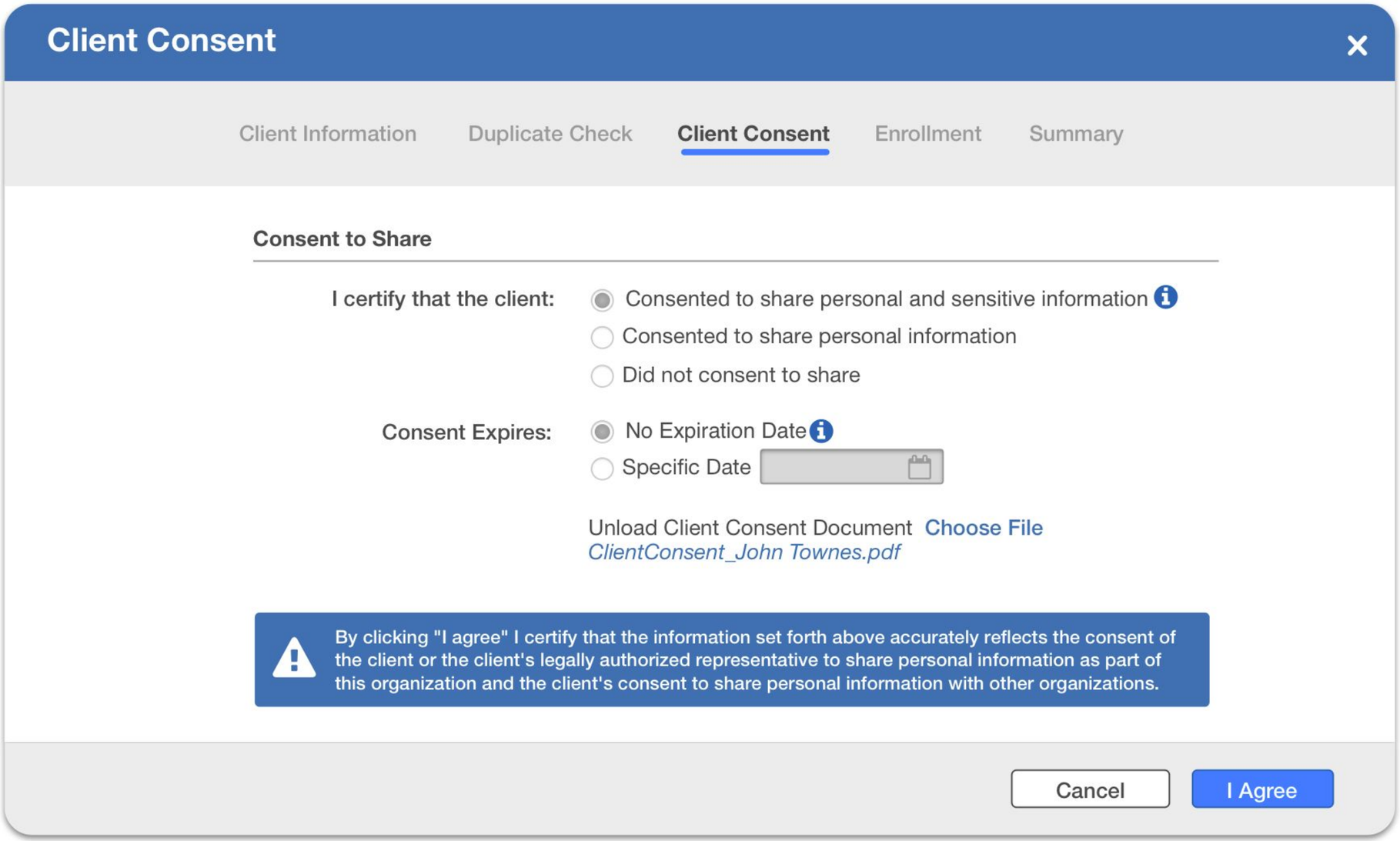
Community Resource Directory

Search CBOs, make referrals and track activity across a network

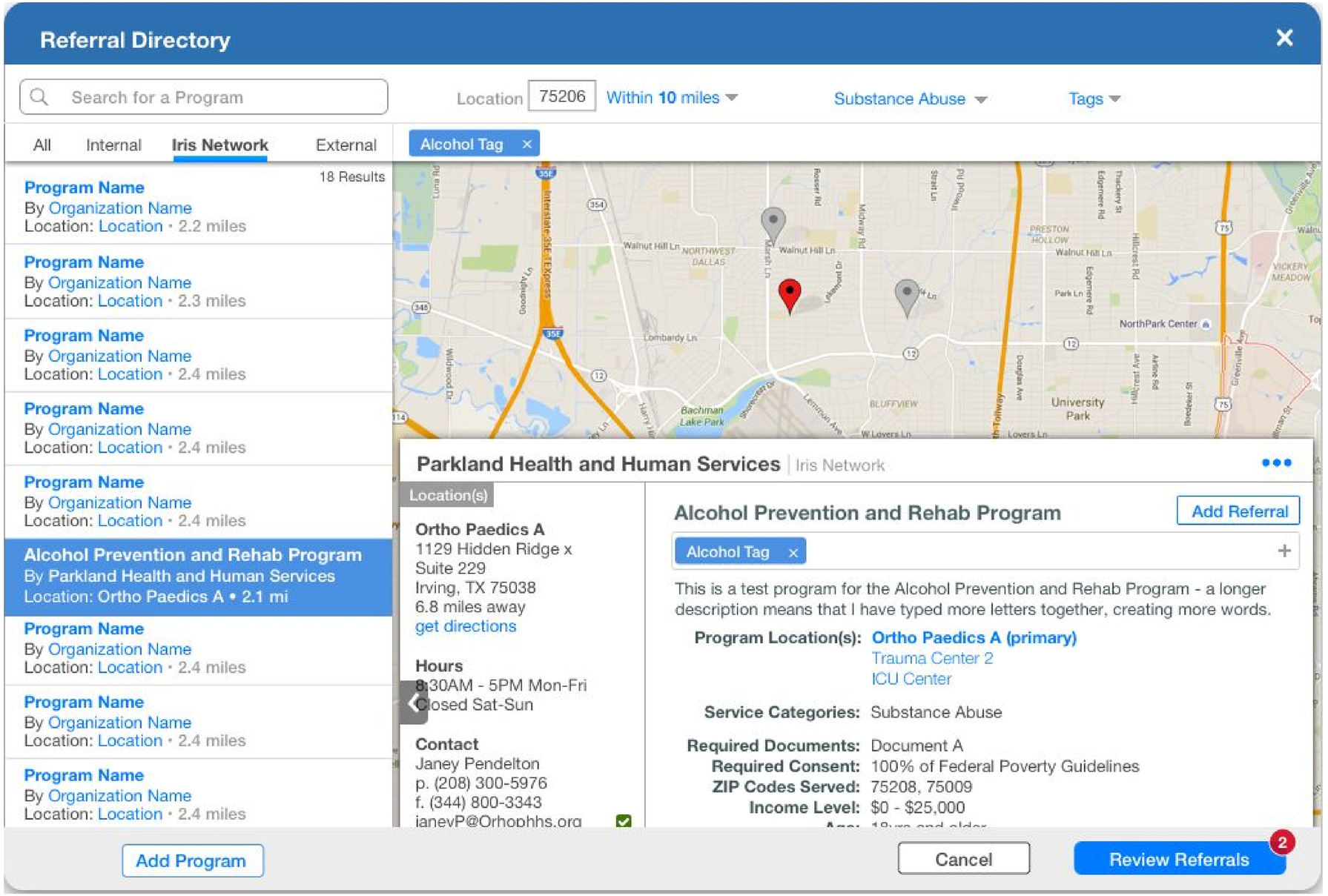
Smart Information Sharing

Improve gaps in care and chronic care programs

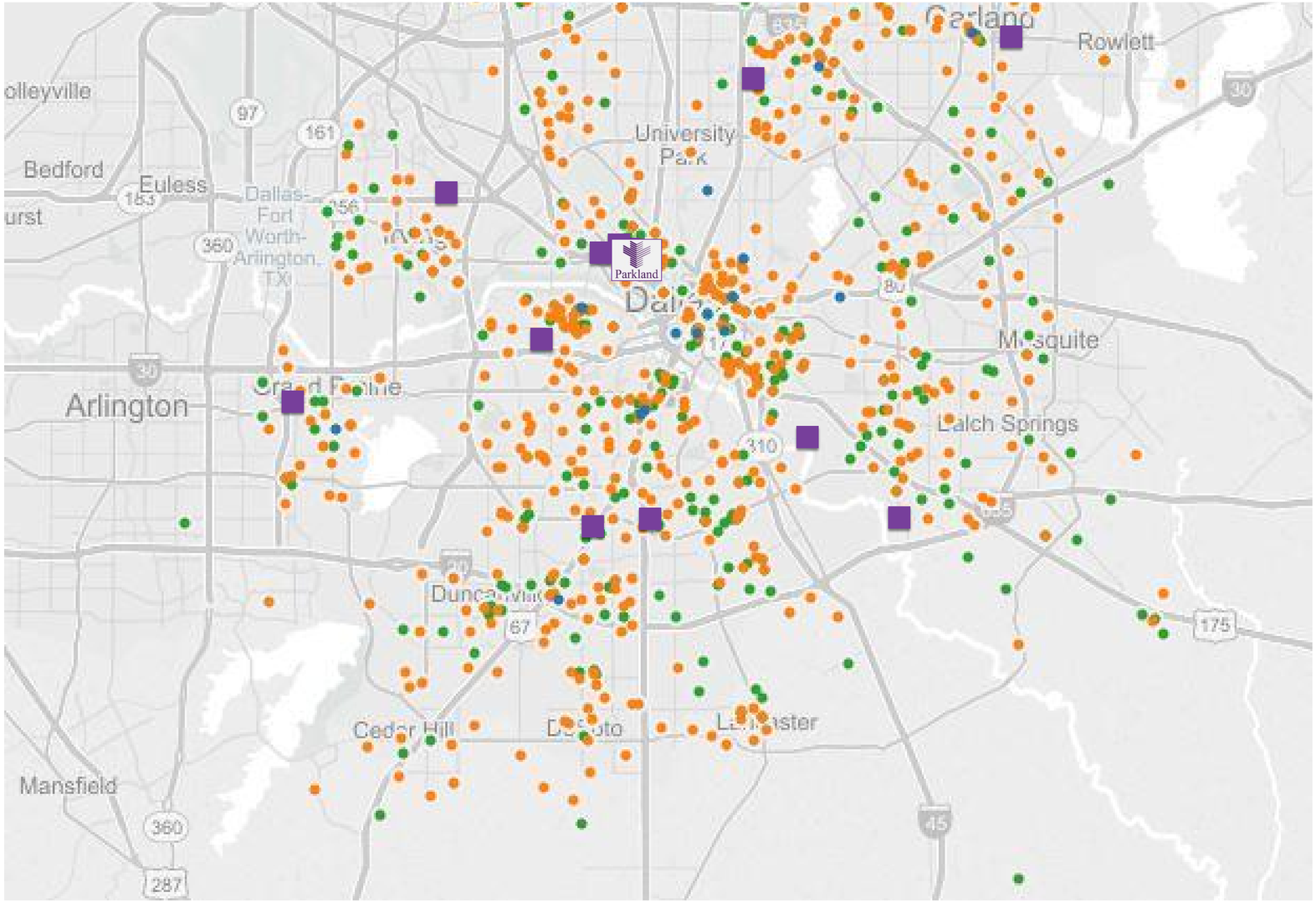
Consents



Community Resource Directory



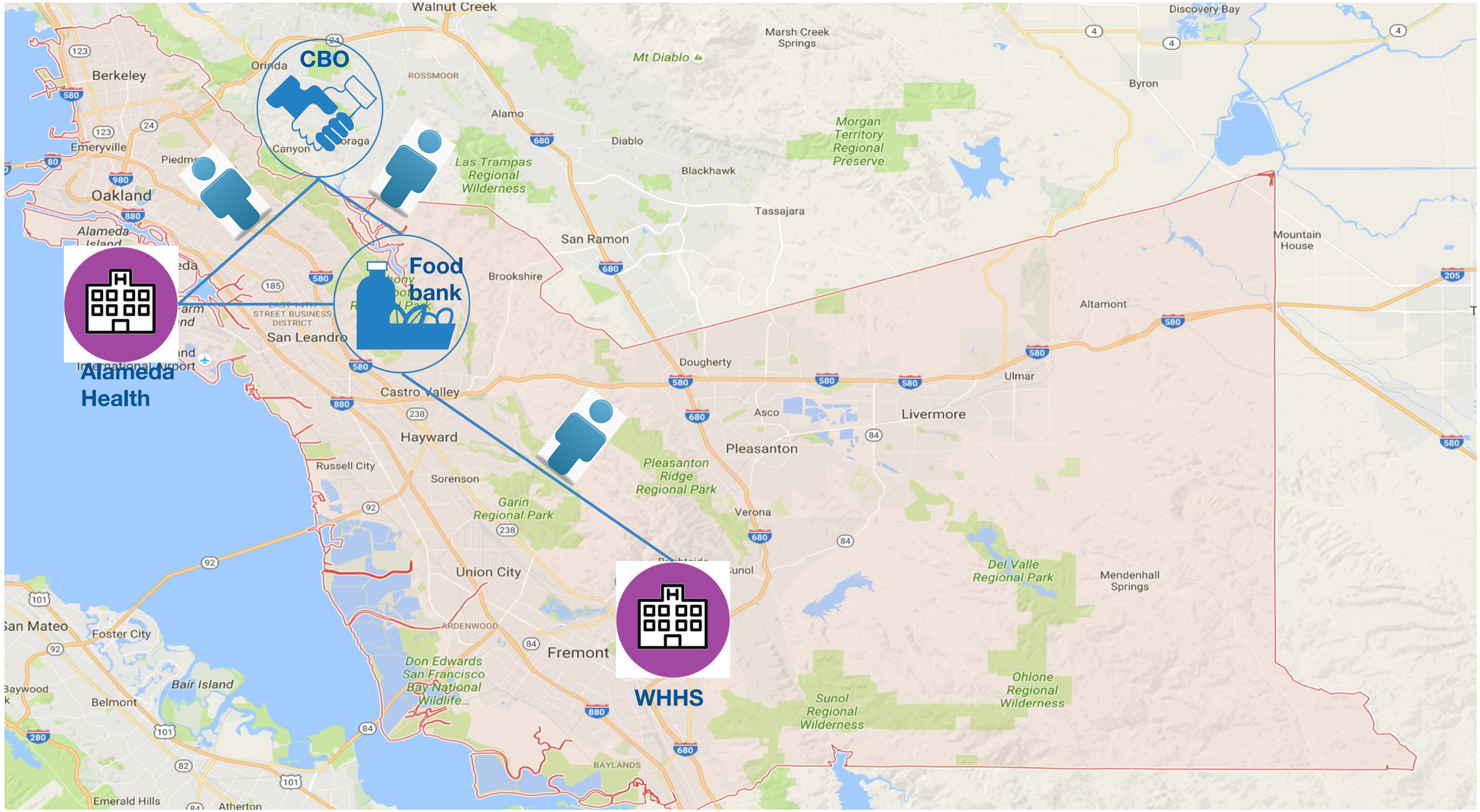
Deployment | Dallas Information Exchange Portal



500+ Organizations

- NTFB Partner Agencies
- North Texas Food Bank Impacted Programs)
- MDHA Projects
- Parkland Community Oriented Primary Care Clinics

Proposed Deployment | Alameda County



Dallas Information Exchange Projects Leveraging Social Determinants of Health

Shared Savings Framework

GroundFloor
Social Innovation @ United Way

Shared Savings Project

Payment Model for Integrated Health and Social Services

Healthcare Provider

Parkland

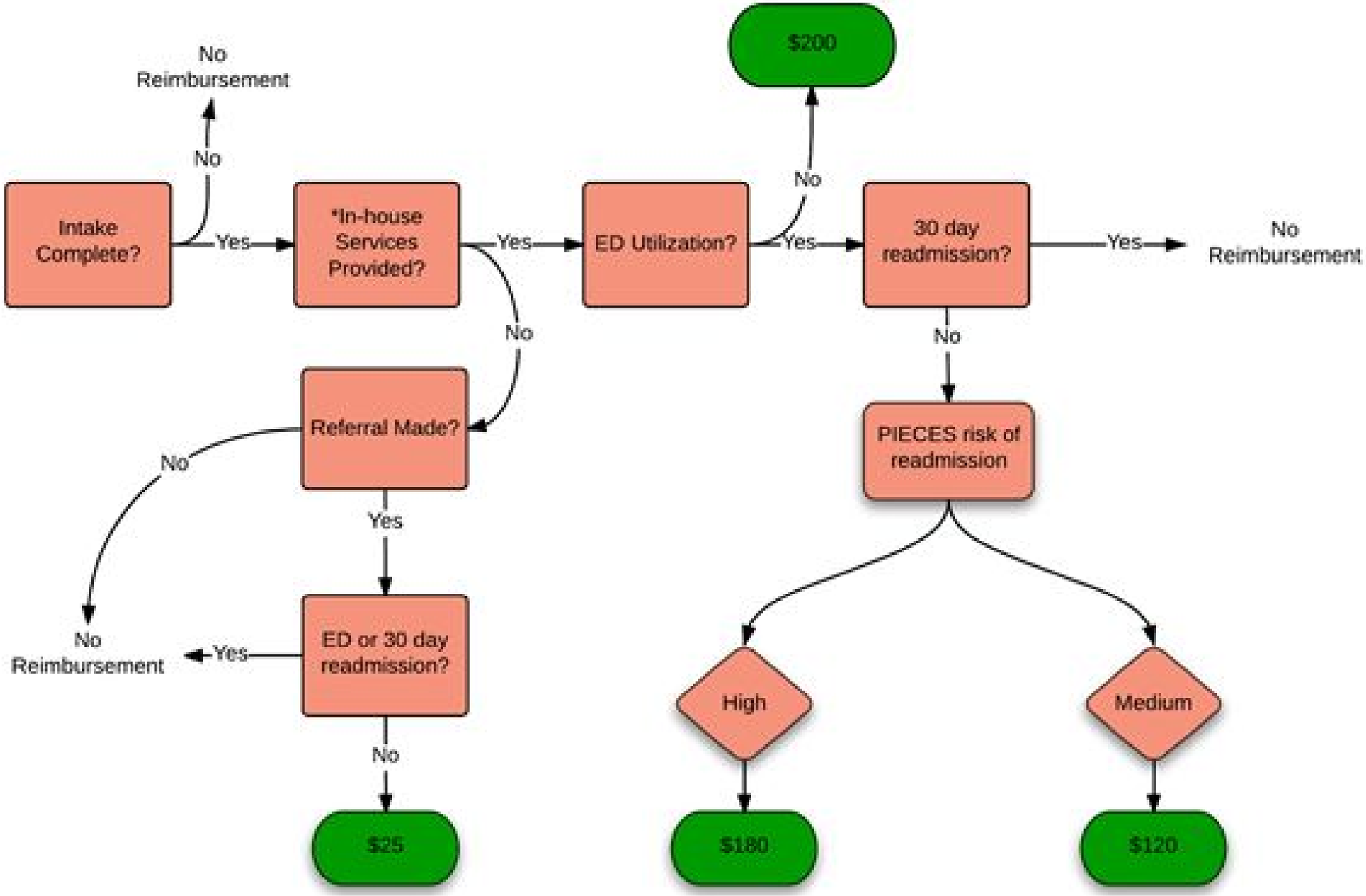
CBO

THE BRIDGE

Outcome	Measurement	Data Source
Individual Level		
Increase Care Coordination	• Homeless patients discharged from ED or inpatient • Case management referral to Bridge with “warm handoff” • Follow-up appointments	• PHHS EMR • Project database (cloud stored in case management software)
Increase apt. adherence	• Proportion of follow-up appointments kept at HOMES Clinic	• Project database (cloud stored in case management software)
Reduce readmissions	• Avg. # of readmissions	• PHHS EMR
Aligned Financial Incentives	• Avoidable ED utilization, readmission and referral to CBO	• Project Database

GroundFloor
Social Innovation @ United Way

Payment Protocol



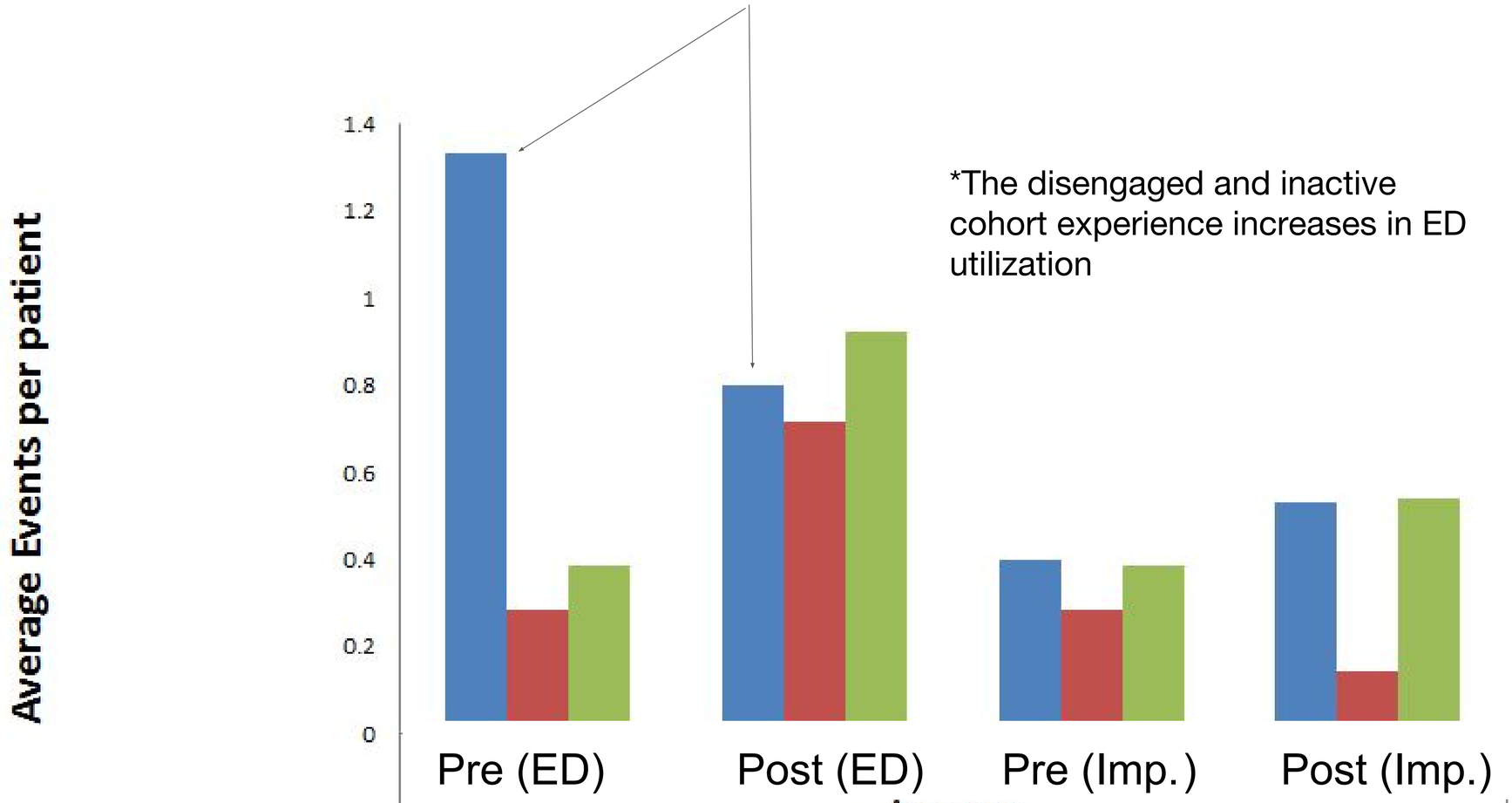
**The Bridge received $2740 in incentive payment from the pilot*

GroundFloor
Social Innovation @ United Way

Outcomes

*Sustained cohort experienced a post-intervention reduction in emergency department utilization from 1.33 to 0.8 (events per patient).

*The disengaged and inactive cohort experience increases in ED utilization



	Pre (ED)	Post (ED)	Pre (Imp.)	Post (Imp.)
Sustained Engagement (n=15)	1.333333333	0.8	0.4	0.533333333
Disengaged (n=7)	0.285714286	0.714285714	0.285714286	0.142857143
Inactive (n=13)	0.384615385	0.923076923	0.384615385	0.538461538

*No statistical significance due to small sample size

Robert Wood Johnson Foundation

DASH Project: Food for Health

Coordinating Care across Sectors to Improve Health among Vulnerable Populations

Healthcare Provider

Parkland

Food Bank

North Texas Food Bank™

Partner Agencies

SHARING LIFE Demonstrating compassion

Crossroads Community Services.

our community pantry a Program of the North Texas Food Bank

Outcome	Measurement	Data Source
Individual Level		
Increase Care Coordination	• Patients w DM & HPTN who are food insecure	• Project database
Reduce ED visits & hospitalizations	• Avg. # of ED visits & hospitalizations vs. control	• PHHS EMR and DFWHC database
Increase prescription fill rate	• Prescriptions filled vs. baseline	• Patient Survey data
Increase apt. adherence	• Proportion of appointments kept	• PHHS EMR
Improve disease mgmt.	• Proportion of patients with HbA1C<7% and blood pressure measurements for hypertension	• PHHS EMR
Organizational Level		
% of clients who received appropriate services	• % of patients who received recommended food items & appointment reminders	

Key Challenges

- **Accurate Measurement of Outcomes and Cost Savings:** many programs lack infrastructure or know how to define and measure relevant outcomes.
  - *Mitigant: Establish a common data dictionary, data set and consent framework across healthcare providers and CBOs with a shared oversight committee*

- **CBO Data and Tech Expertise:**
  - Mitigant: utilize interoperable workflow case management systems to connect providers and CBOs

- **Sharing of Savings:** limited standard for sharing mechanisms
  - *Mitigant: Focus on health care penalty areas.*
  - *Identify sponsor orgs (philanthropies, foundations, employers, etc.) to provide funding and guide financial partnership structures.*

- **Sustainability:** many programs are grant funded and may not be sustainable after funding is complete
  - *Mitigant: Establish CBO coalition aligned with health care provider's strategic plans*

Lessons Learned

- **Navigating Cross Sector Relations:** Differing approaches and solutions can be reconciled by open communication and collaboration.

- **Alignment:** Approach every conversation with an open-mind and willingness to collaborate, also secure leadership support for the project.

- **Improving Staff Training:** Provide opportunities for staff to further develop patient-centered approaches, such as motivational interviewing.

- **Operations:** Develop a closed loop referral pathway to provide all stakeholders useful information.

- **Competing Priorities:** Build upon existing pathways and eliminate duplication by targeting enrollment areas that have high opportunistic value, such as volume efficiency, etc.

- **Encouraging Best Discharge Practices:** Ensure medication and transportation support programs address patient needs.

Thank You

Pieces Technologies, Inc.

We provide end-to-end monitoring, prediction, documentation & discovery software for health systems & community based organizations.

Headquarters

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Our Mission

To advance health at every decision.

Our People

Physicians, Applied Math, Computer Science, Engineering, Quality and Safety Science

Methods | 64 Communities and Organizations Evaluated

Mixed method approach

- Literature review, Delphi expert panel, and interviews with innovative programs to develop a maturity rubric for communities participating in these types of efforts

- Semi-qualitative surveys and interviews of 64 communities and organizations, including our stakeholders in Dallas, to identify phenotypes, challenges and solutions