The University of Texas at Austin
Dell Medical School

Office of the National Coordinator for Health Information Technology

Leading Edge Acceleration Projects

FHIR-enabled Social and Health Information Platform (FS): Integrating a closed-loop social services referral system into electronic health records in Federally Qualified Health Centers using FHIR

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Partners

Funding from the Leading Edge Acceleration Projects (LEAP) in Health IT from the Office of the National Coordinator for Health IT (ONC).

ONC Office of the National Coordinator for Health Information Technology

Providers

Integral Care

Central Texas Food Bank

People's Community Clinic

HIEs

connexus
Central Texas

GNOHIE Greater New Orleans Health Information Exchange
New Orleans

Connected Care Exchange
Rio Grande Valley

Technical

emi ADVISORS

gravity PROJECT

findhelp

UNITE US

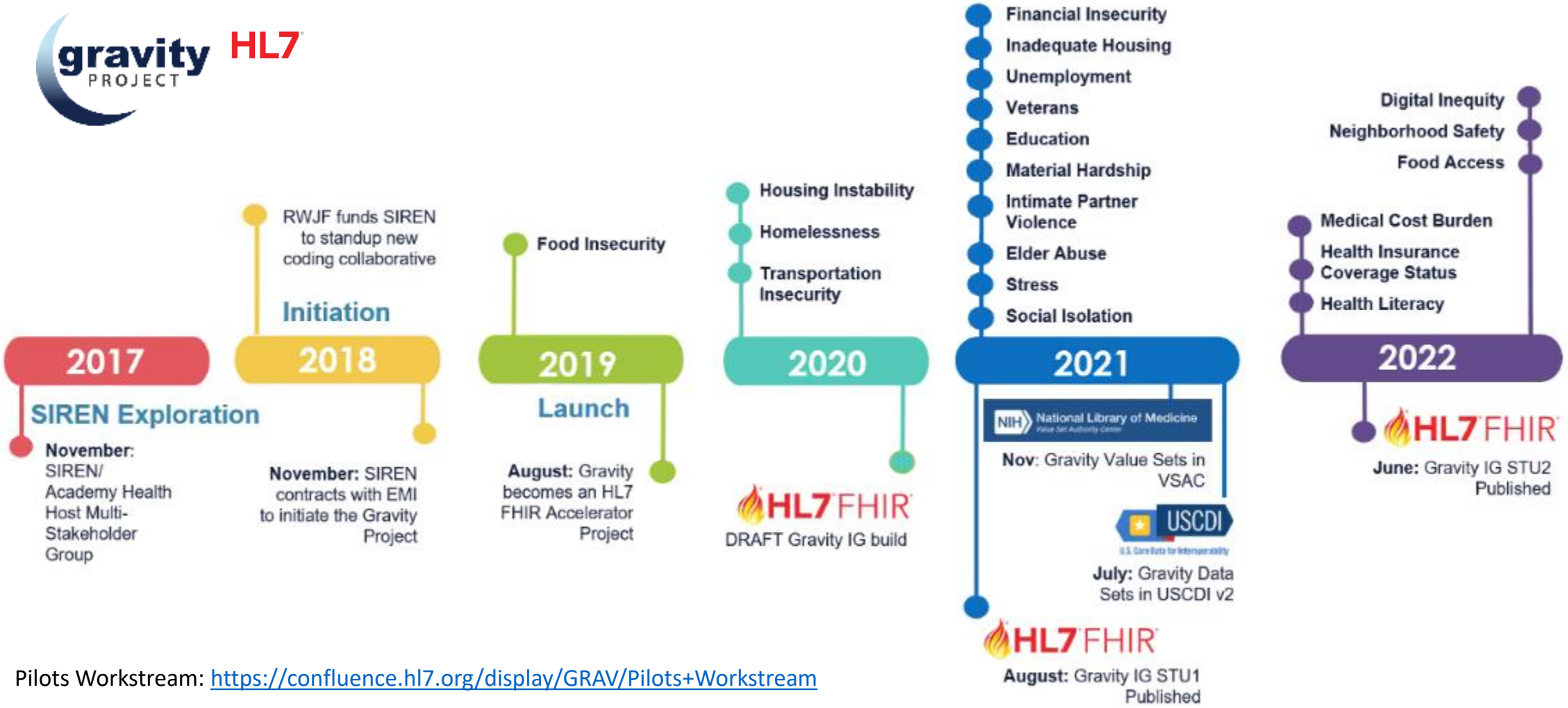
Project Aims

Aim 1 Develop an open-source, “closed loop” social services referral management system, ***FHIRed-SHIP***, using IT standards and FHIR APIs in an FQHC and LMHA

Aim 2 Demonstrate the feasibility of ***FHIRed-SHIP*** to fulfill the Gravity Project Use Cases Package for SDoH for screening, diagnosis, planning, and interventions in selected patients

Aim 3 Develop and implement a toolkit to pilot ***FHIRed-SHIP*** as a referral management system with the HIEs in Harlingen, TX and New Orleans, LA

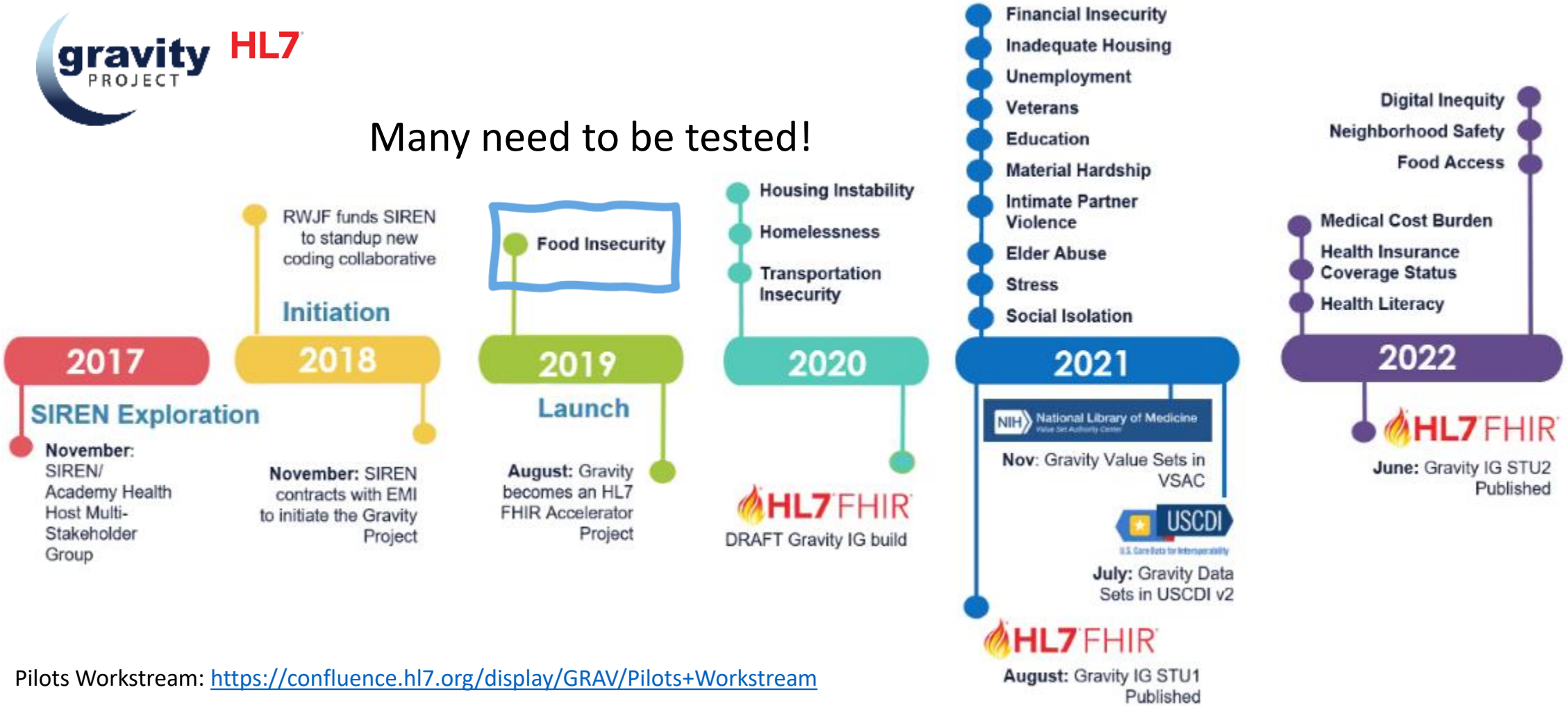
Gravity Project and USCDI



Pilots Workstream: https://confluence.hl7.org/display/GRAV/Pilots+Workstream

Gravity Project and USCDI

Many need to be tested!



Pilots Workstream: https://confluence.hl7.org/display/GRAV/Pilots+Workstream

Supplemental Nutrition Assistance Program (SNAP)

- One of the most effective national programs to improve food security, reduce poverty, and improve health of millions
- Over 33 million individuals in the US still live in food-insecure households
- Clinical referrals to Community-Based Organizations (CBOs) increases SNAP access
- Referral systems have only increased access by 6% to 8%
- Lack of data sharing between clinical and social providers

- Keith-Jennings B, Llobrera J, Dean S. Links of the Supplemental Nutrition Assistance Program With Food Insecurity, Poverty, and Health: Evidence and Potential. Am J Public Health. 2019 Dec;109(12):1636-1640. doi: 10.2105/AJPH.2019.305325. PMID: 31693420; PMCID: PMC6836787.
- United States Department of Agriculture. How Many People Lived in Food-insecure Households?https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/key-statistics-graphics/#insecure
- Carpenter B, Kuchera AM, Krall JS. Connecting Families at Risk for Food Insecurity With Nutrition Assistance Through a Clinical-Community Direct Referral Model. Journal of Nutrition Education and Behavior, Volume 54, Issue 2, 2022. Pages 181-185. https://doi.org/10.1016/j.jneb.2021.09.014
- Stenmark SH, Steiner JF, Marpadga S, Debor M, Underhill K, Seligman H. Lessons Learned from Implementation of the Food Insecurity Screening and Referral Program at Kaiser Permanente Colorado. Perm J. 2018;22:18-093. doi: 10.7812/TPP/18-093. PMID: 30296400; PMCID: PMC6175601.

FHIRed-SHIP

FHIR-based integration of a Patient Engagement Technology (FHIRedApp) and a Social and Health Information Platform (SHIP) to allow for real-time care coordination between social and health care providers, and patients.

FHIRed-SHIP

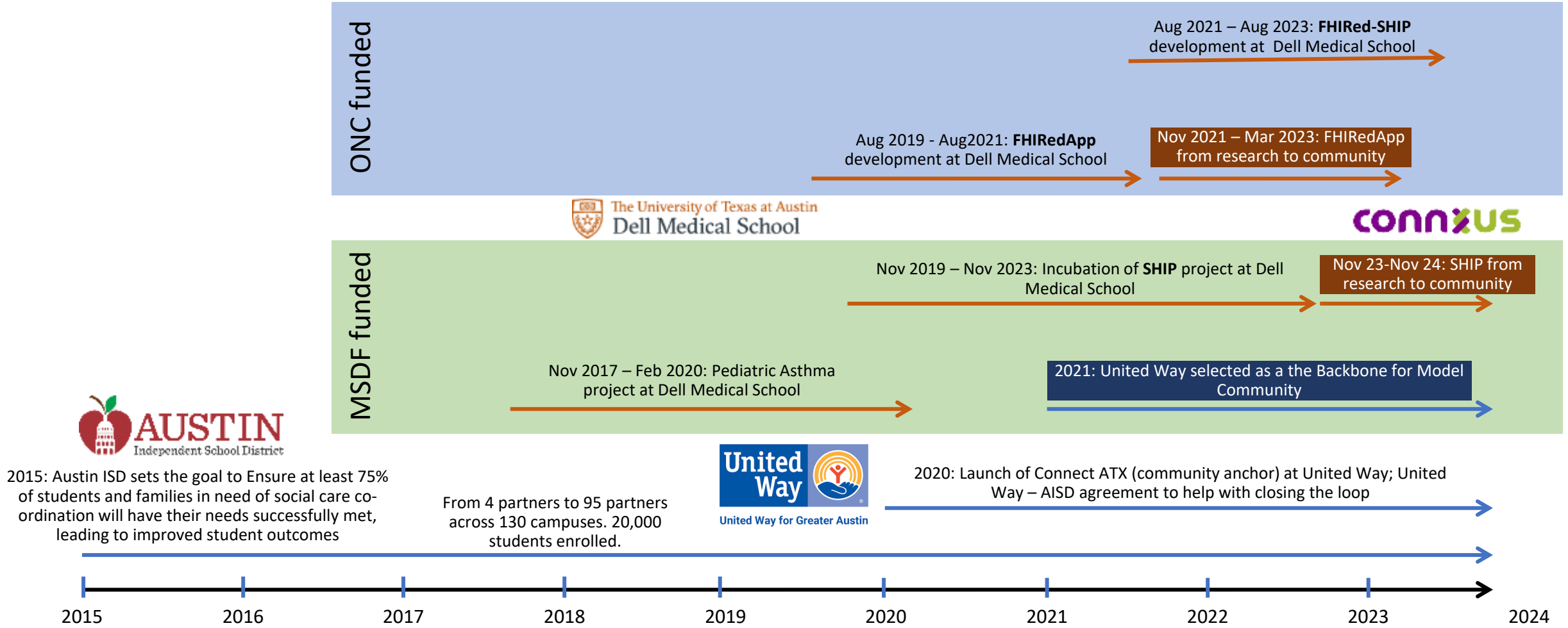
FHIR-based integration of a Patient Engagement Technology (FHIRedApp) and a Social and Health Information Platform (SHIP) to allow for real-time care coordination between social and health care providers, and patients.

Standards and Technologies Used

SDOH Domain	Gravity Terminology	Exchange Standards
Food Insecurity	• Screening (LOINC) • Diagnosis (SNOMED-CT, ICD-10-CM) • Goals (LOINC and SNOMED CT) • Interventions (SNOMED-CT, CPT/ HCPCS)	FHIR Core IG: Questionnaire, QuestionnaireResponse; FHIR SDOH Clinical Care IG: Observation, Condition, ServiceRequest, Task, Procedure.

Timeline

Almost 10 years of efforts aimed at addressing our social challenges through community collaborations.



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Leading Edge Acceleration Projects

FHIRedApp: An API-based patient engagement platform for the 21st Century

Aug 2019 – Aug 2021

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Department of Population Health
Dell Medical School
The University of Texas at Austin

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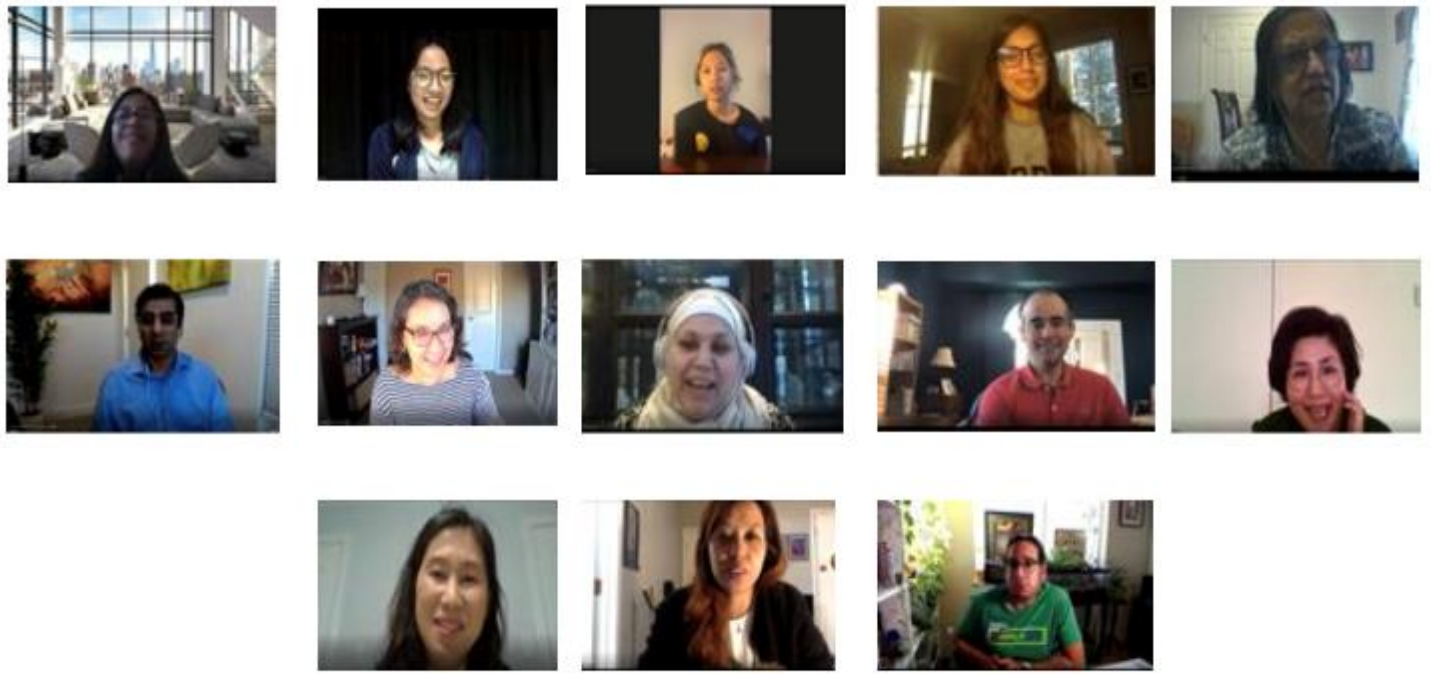
FHIRedApp - ONC LEAP

- FHIRedApp is a Patient Engagement Technology that makes it easy for patients to gain access and provide access to their health data as defined in the 21st Century Cures Act.

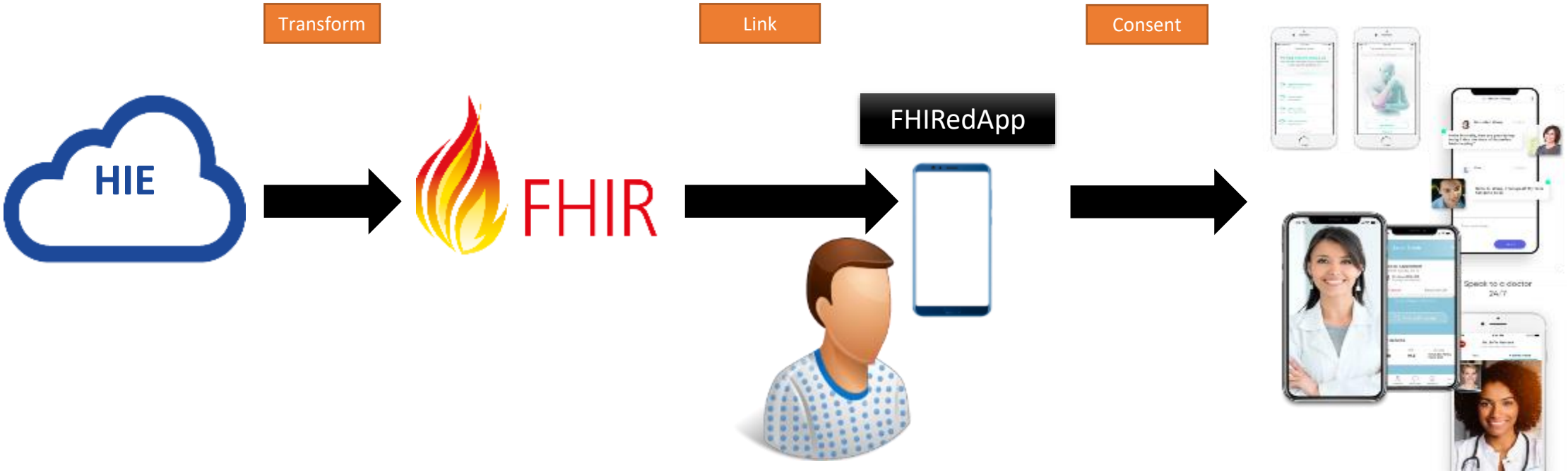
- Designed through Community Engagement Studios and Human-Centered Design approaches and developed to lower barriers for underserved communities to access their health data.

Community Input



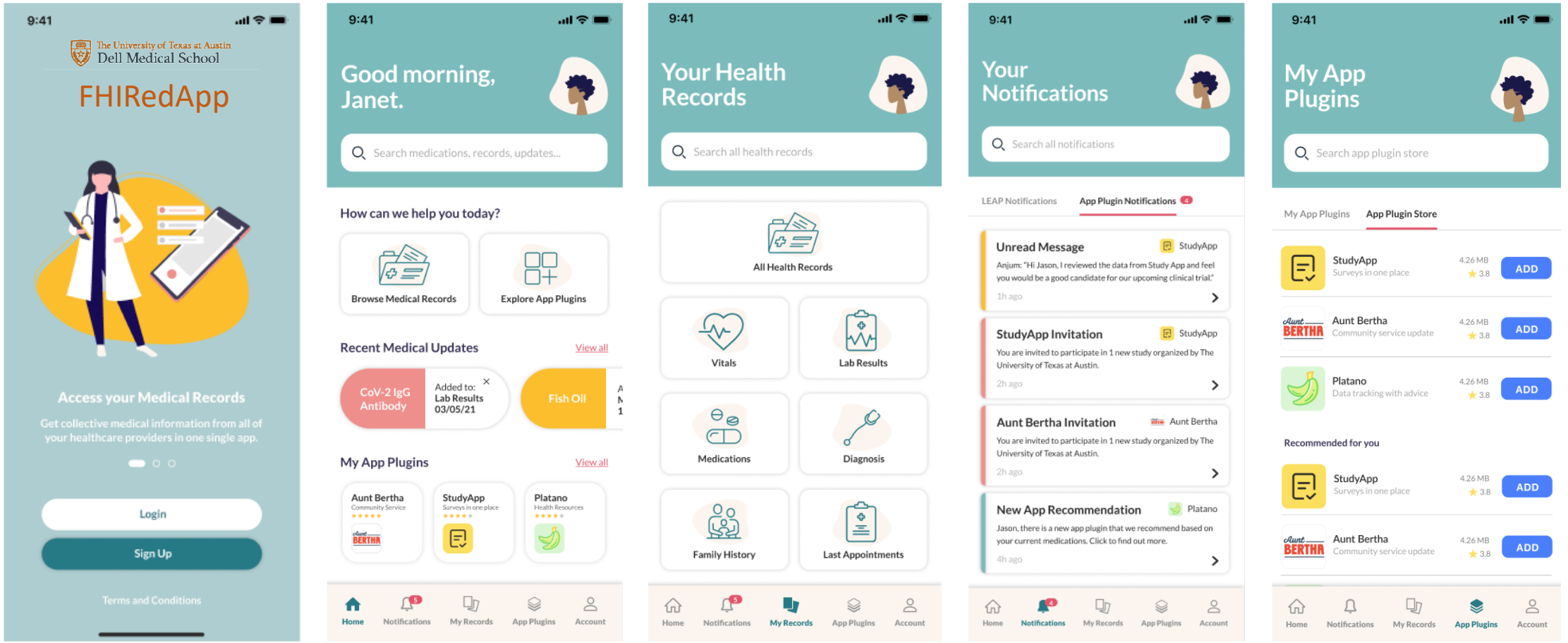
How:

Transform clinical data from a Health Information Exchange (HIE) into FHIR resources, **Link** users that download FHIRedApp to their own data from the HIE, and allow those users to **Consent** 3rd party Apps to access their clinical data and provide services. All while considering the voices of underserved populations and user-centered design best practices.

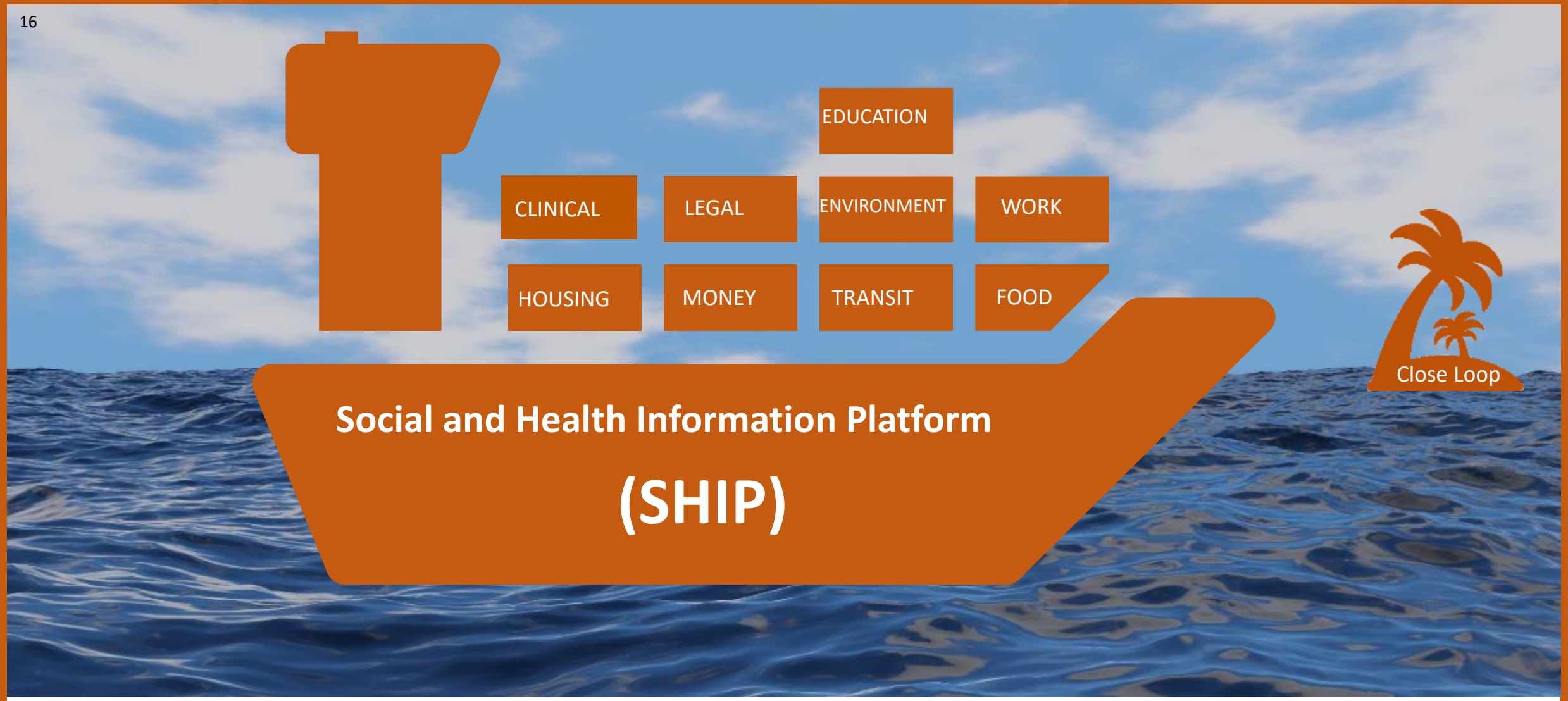


3rd party Apps and service providers

Available on iOS and Google Play stores



Khurshid A, Oliveira E, Nordquist E, Lakshminarayanan V, Abrol V. FHIRedApp: a LEAP in health information technology for promoting patient access to their medical information. JAMIA Open. 2021 Dec 28;4(4):ooab109. doi: 10.1093/jamiaopen/ooab109. PMID: 35155997; PMCID: PMC8826978.



Social and Health Information Platform

(SHIP)

Michael & Susan Dell FOUNDATION

findhelp.org

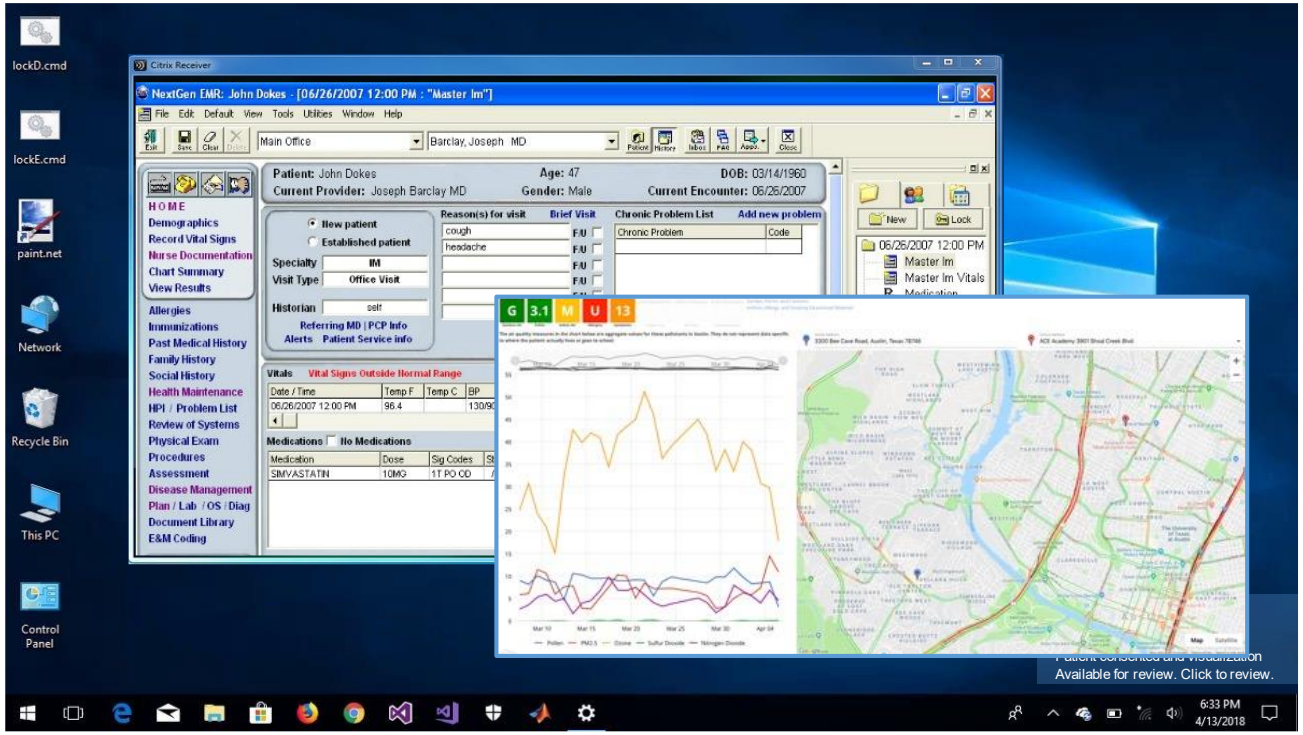
connexus

The University of Texas at Austin Dell Medical School

Social and Health Information Platform (SHIP)

- A digital platform that facilitates data sharing across sectors and integrates clinical and social sector data into user-friendly longitudinal records.

- SHIP makes health-related data (clinical + social) available in the workflow of care teams, including integrating with EHRs.
- SHIP aims to:
  - turn data into easy-to-read, actionable visuals
  - facilitate efficient and comprehensive patient care and coordination for individuals
  - provide enhanced insights into community-level health issues, service gaps, and possible solutions across sectors

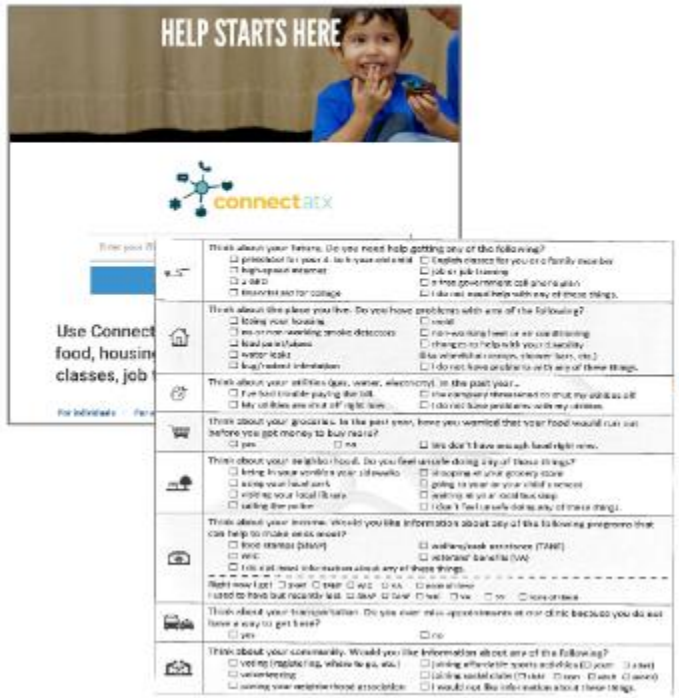


SHIP Data Sources

SDOH Needs

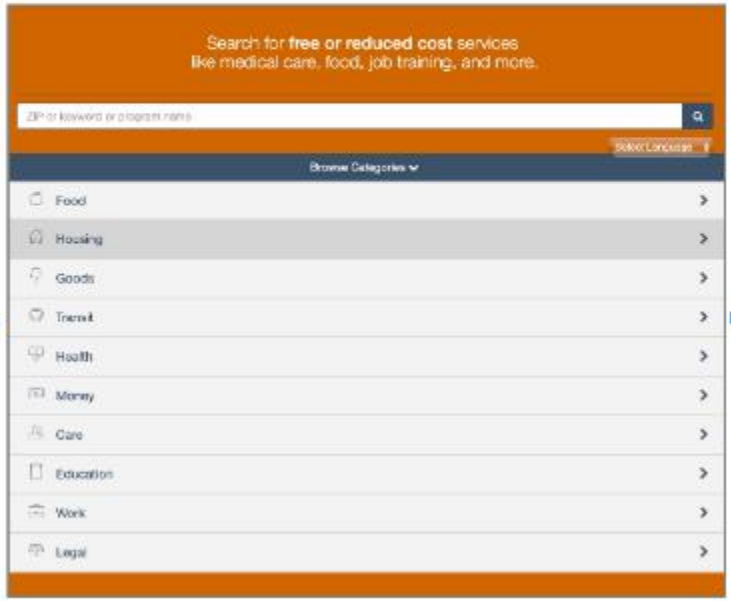
PRAPARE

United Way for Greater Austin



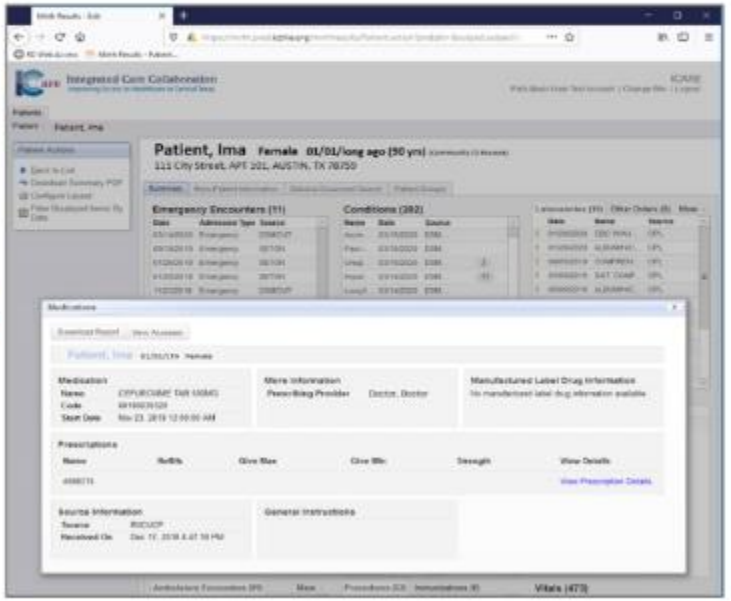
Social Services

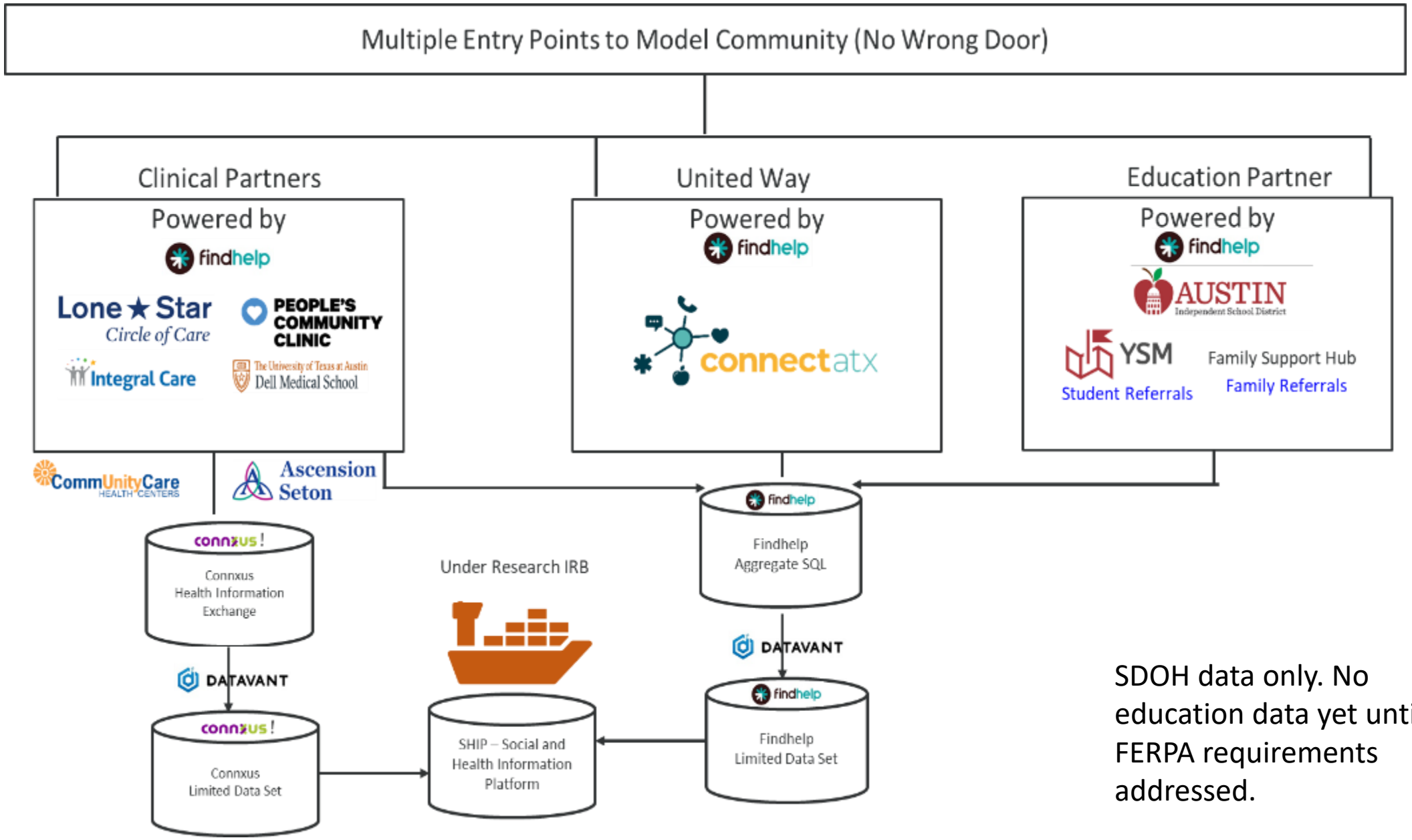
findhelp



Clinical Services

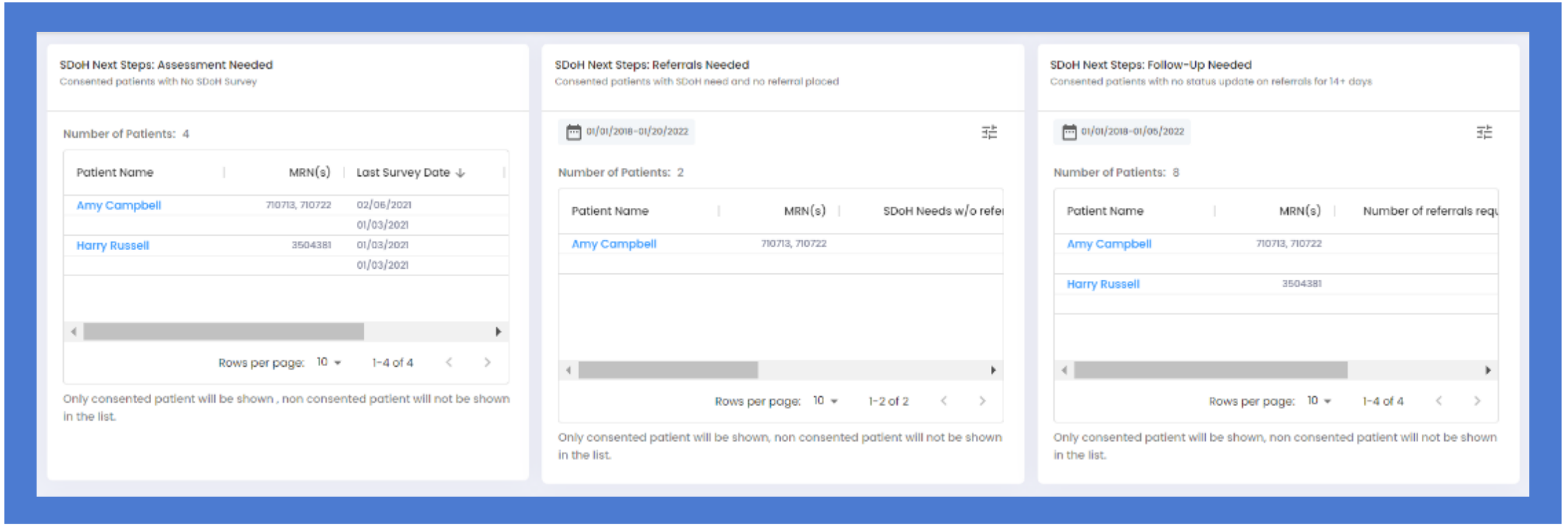
connexus





SDOH data only. No education data yet until FERPA requirements addressed.

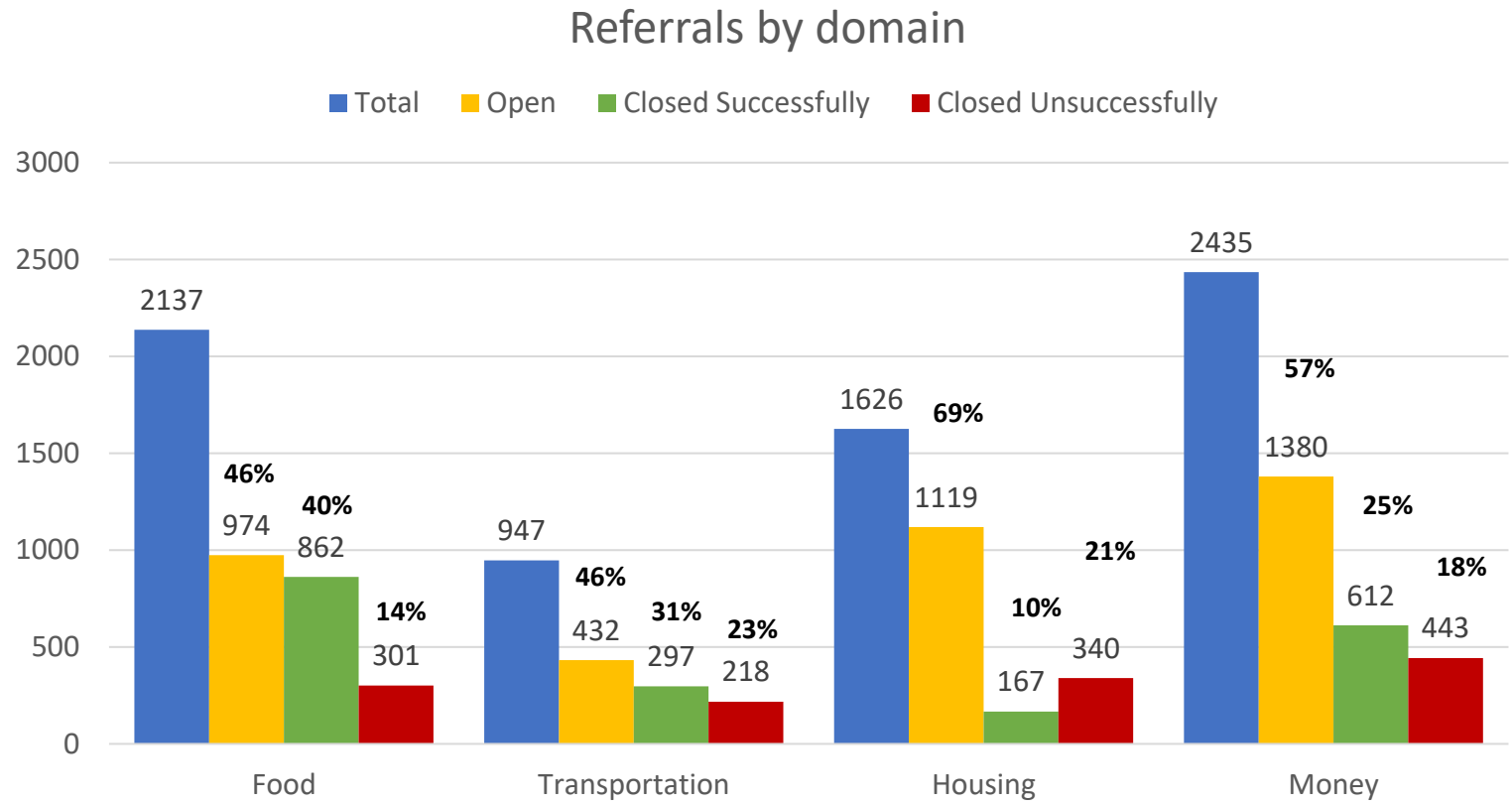
Worklist for Community Health Workers



Assists CHWs by organizing their 3 main SDoH-related tasks (left to right):

1. completing SDoH assessments for individuals that don't have a current assessment
2. placing referrals for identified SDoH needs, or
3. updating the status of the ones with referrals made.

Community Impact



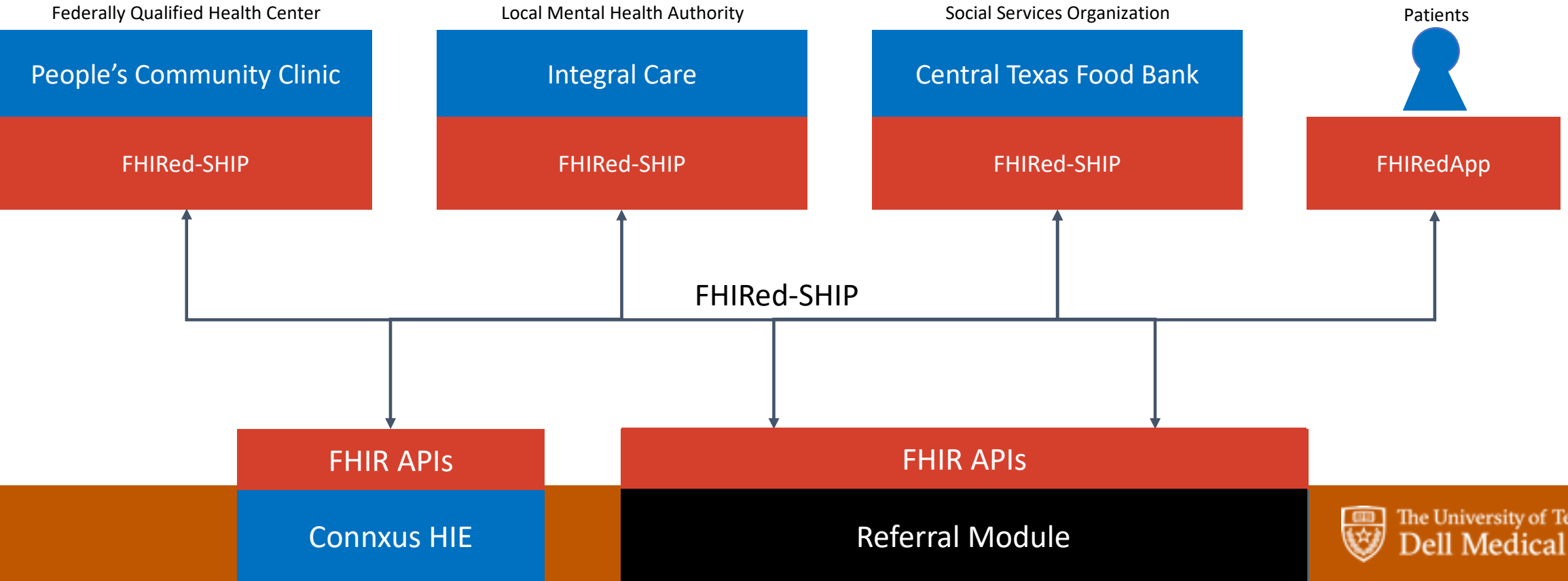
Average number of days a referral is open – 26 days

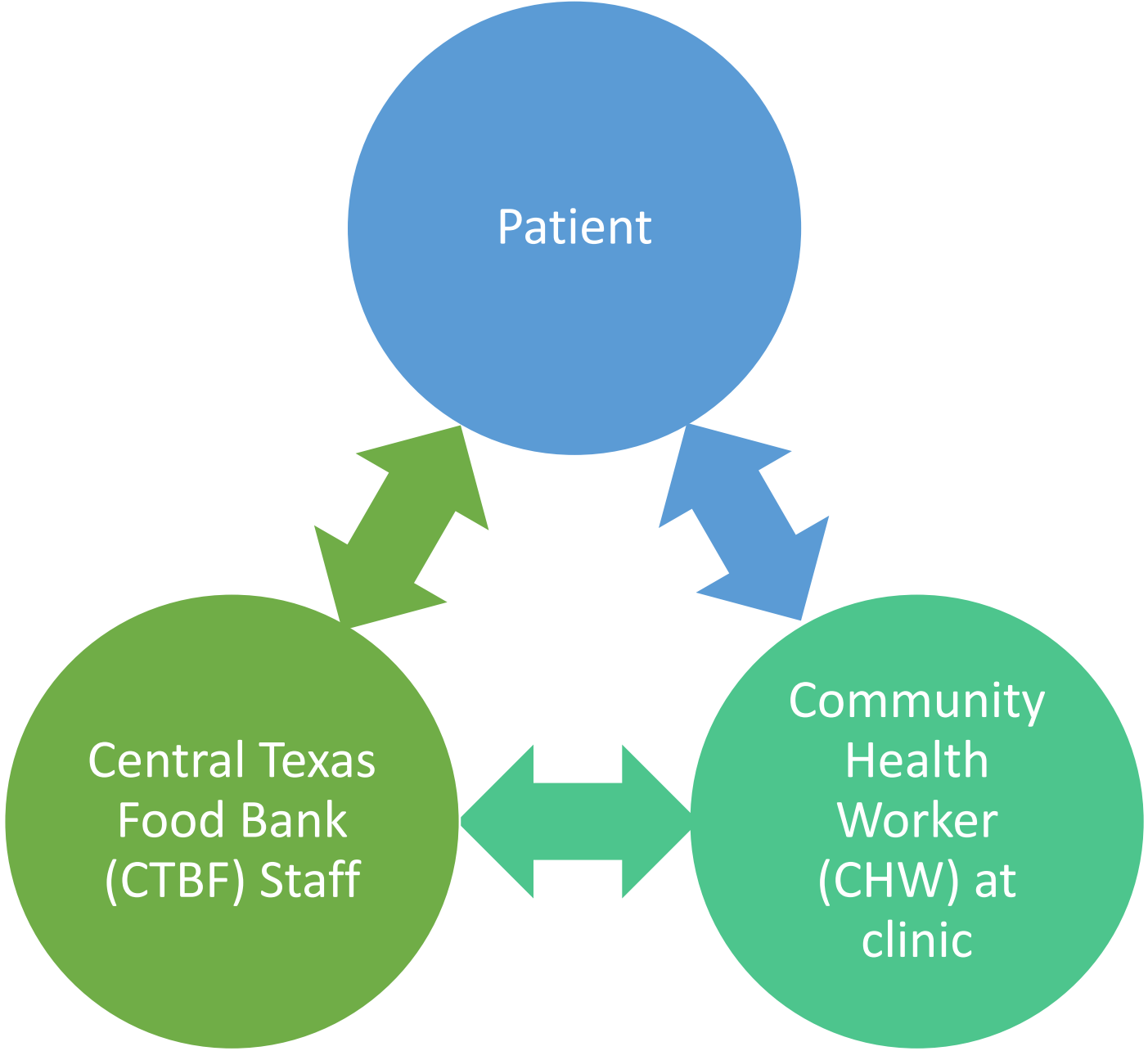
% of open referrals high – need to further investigate

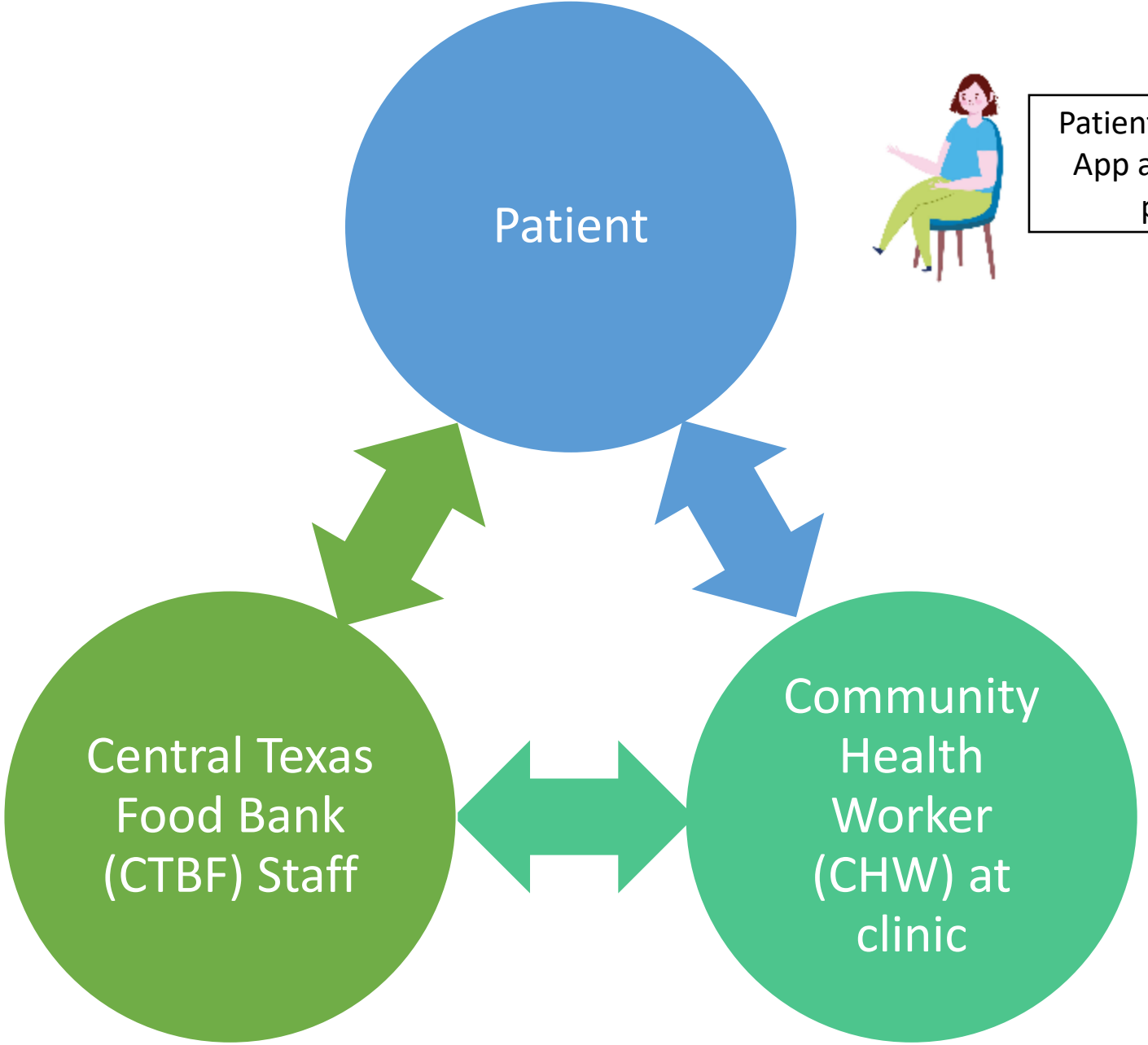
Referral closure rates vary by domain, demonstrating the inherent difficulty in closing some needs such as housing where supply is not sufficient to meet demand

FHIRed-SHIP

FHIR-based integration of a Patient Engagement Technology (FHIRedApp) and a Social and Health Information Platform (SHIP) to allow for real-time care coordination between social and health care providers, and patients.

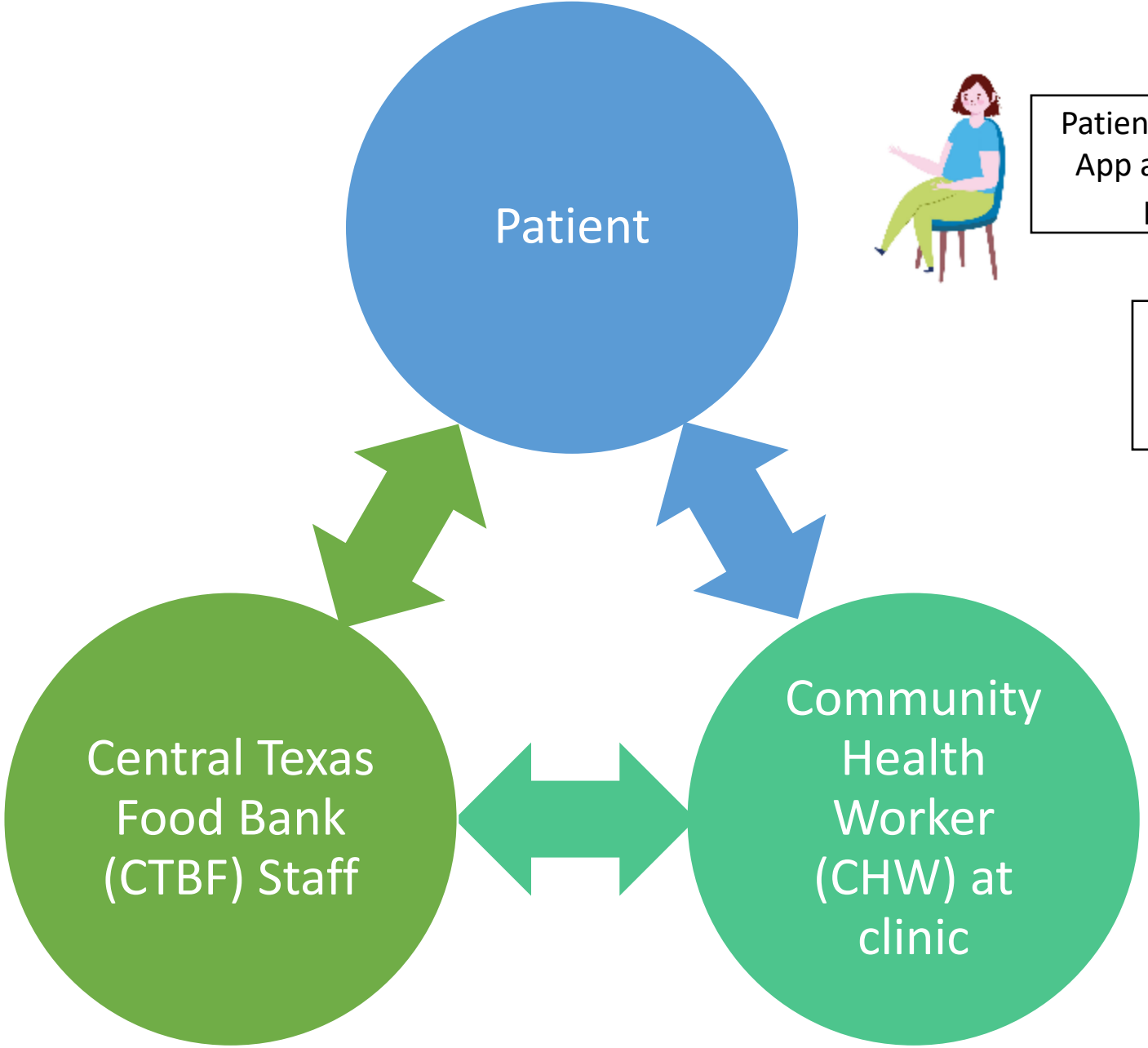



Patient
Central Texas Food Bank (CTBF) Staff
Community Health Worker (CHW) at clinic



①

Patient downloads the App and consents to participate

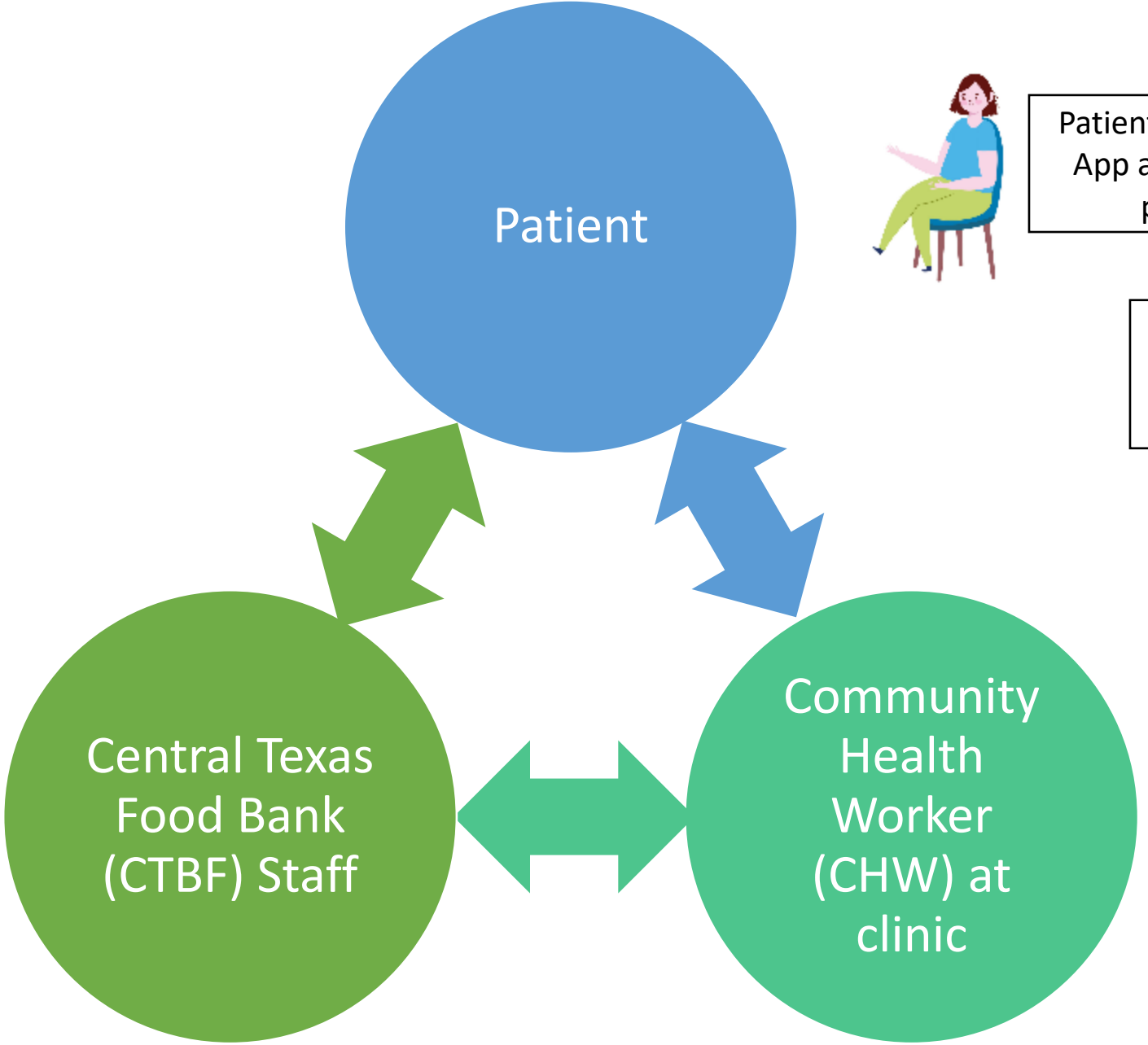


①

Patient downloads the App and consents to participate

②

Patient completes SDoH assessment on the App



①

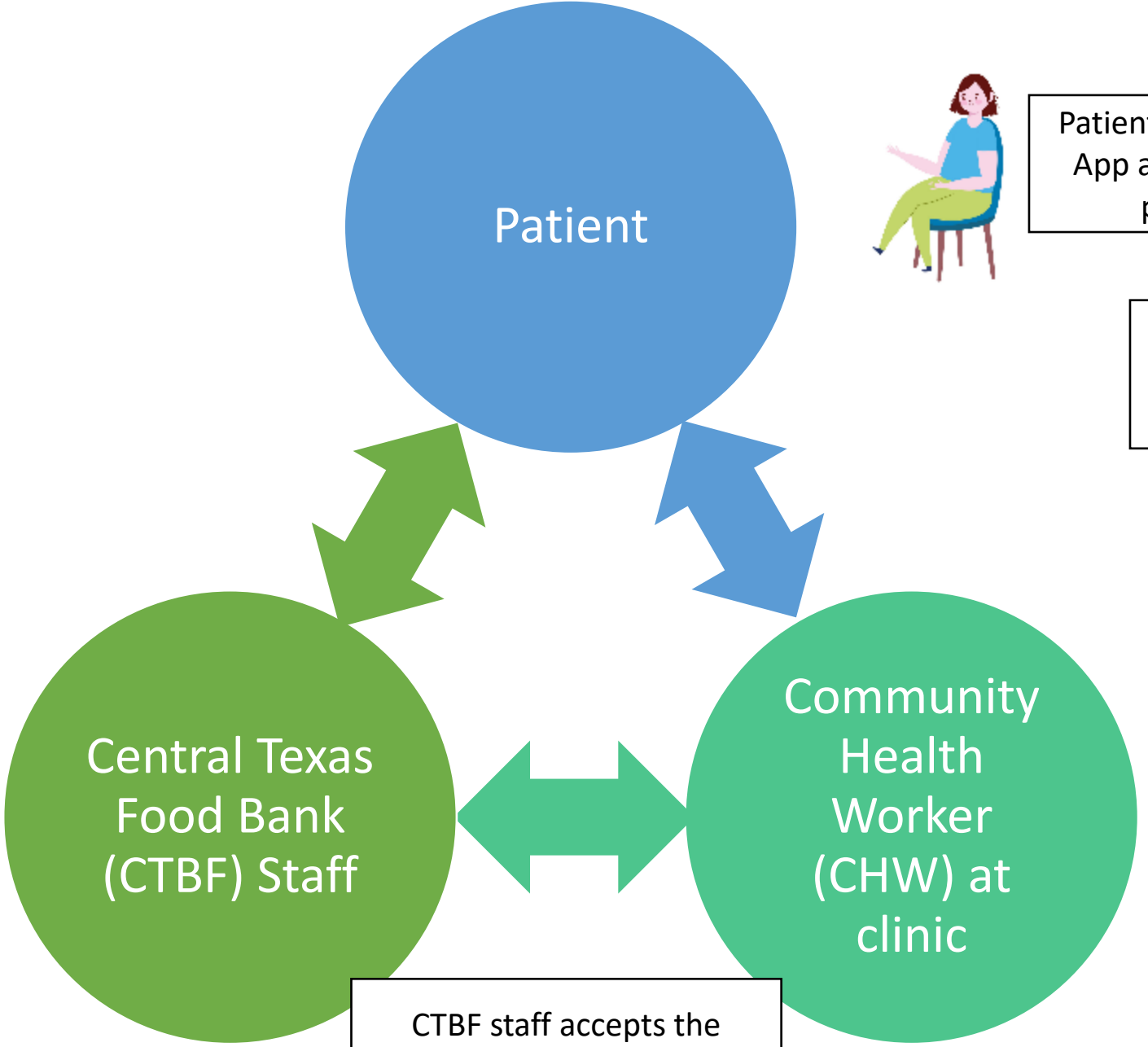
Patient downloads the App and consents to participate

②

Patient completes SDoH assessment on the App

③

CHW places referral to CTFB(if SNAP benefits need is expressed.



① Patient downloads the App and consents to participate

② Patient completes SDoH assessment on the App

③ CHW places referral to CTFB(if SNAP benefits need is expressed.

④ CTBF staff accepts the referral and sends intake questions to patient

Patient

Central Texas Food Bank (CTBF) Staff

Community Health Worker (CHW) at clinic

① Patient downloads the App and consents to participate

② Patient completes SDoH assessment on the App

③ CHW places referral to CTFB(if SNAP benefits need is expressed.

④ CTBF staff accepts the referral and sends intake questions to patient

⑤ Patient responds to questions. If eligible, patient schedules a meeting with CTBF staff

Patient

Central Texas Food Bank (CTBF) Staff

Community Health Worker (CHW) at clinic

① Patient downloads the App and consents to participate

② Patient completes SDoH assessment on the App

③ CHW places referral to CTFB(if SNAP benefits need is expressed.

④ CTBF staff accepts the referral and sends intake questions to patient

⑤ Patient responds to questions. If eligible, patient schedules a meeting with CTBF staff

⑥ Patient uploads required documents. CTBF staff submits SNAP application on behalf of patient

Patient

Central Texas Food Bank (CTBF) Staff

Community Health Worker (CHW) at clinic

① Patient downloads the App and consents to participate

② Patient completes SDoH assessment on the App

③ CHW places referral to CTFB(if SNAP benefits need is expressed.

④ CTBF staff accepts the referral and sends intake questions to patient

⑤ Patient responds to questions. If eligible, patient schedules a meeting with CTBF staff

⑥ Patient uploads required documents. CTBF staff submits SNAP application on behalf of patient

⑦ CTBF staff has access to patient's SDoH assessment (the one patient completed at the clinic)

Current Workflow

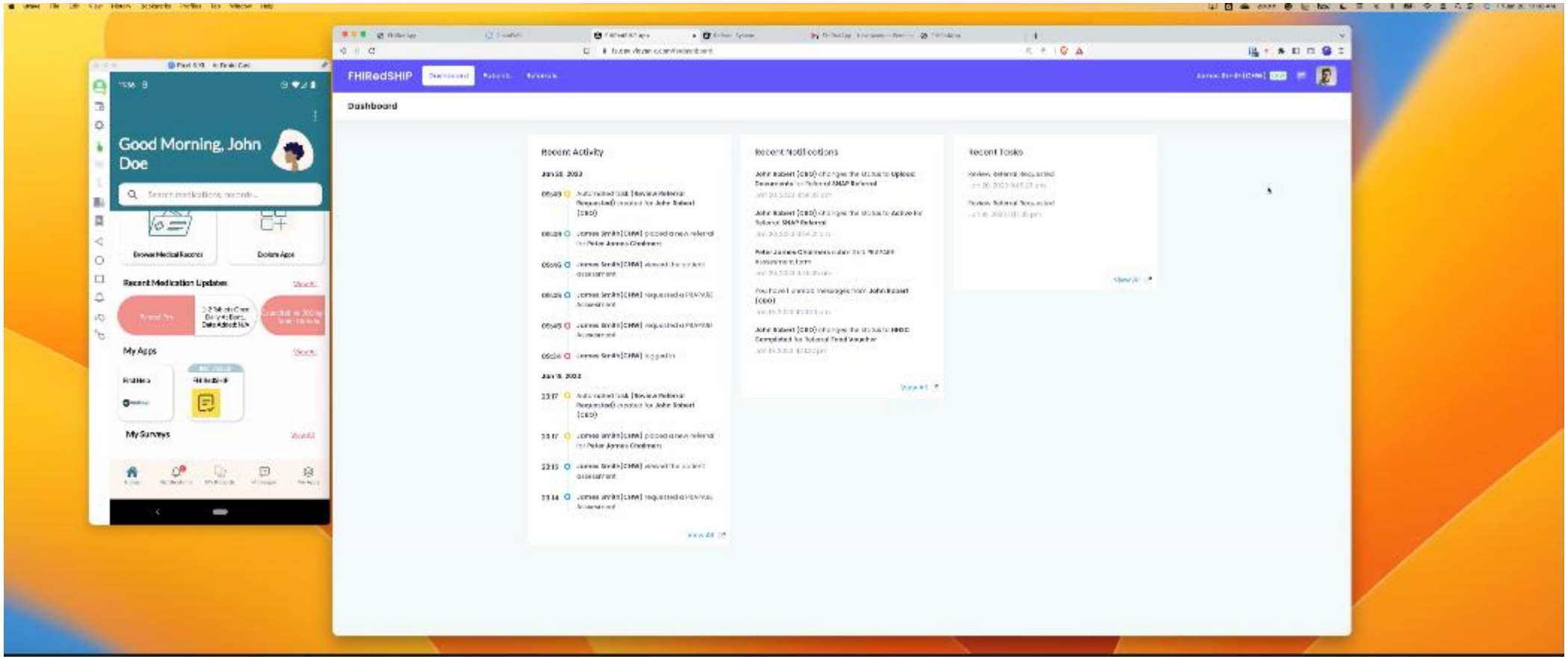
Step	Limitations	Enhancements
Community Health Worker/Social Worker completes the SDOH assessment on behalf of the patient on a referral platform.	Patient has NO access to their SDOH assessment.	Patient completes assessment and keeps it electronically to share with other providers.
Community Health Worker/Social Worker places the referral to Central Texas Food Bank if the need is expressed in the SDOH form.	Patient does NOT receive any notification or follow up about the referral.	Patient and services providers are alerted real-time through FHIRed-SHIP's web and mobile based Apps.
Central Texas Food Bank staff reaches the patient either via email or phone.	If patient responds, the patient answers pre-screener questions on the phone or patient makes a in-person visit to respond to pre-screener questions.	Patient receives screening questions on FHIRedApp on their mobile device or computer and communicates directly with service providers.

Current Workflow

Step	Limitations	Enhancements
Central Texas Food Bank staff follows up with the patient either via email or phone to schedule an appointment if the patient qualifies.	Patient brings the documents to the appointment.	Patients can take pictures and upload documents to the platform in preparation to complete the application with the food bank.
Central Texas Food Bank staff submits SNAP application to HHSC. The staff does not have access to patient's SDOH assessment from the clinic.	Patient is re-assessed for their social needs.	Patient can share needs assessment already completed at the clinic and saved in their FHIRedApp.
Central Texas Food Bank staff does not receive notification about SNAP application status. They follow up with the patients via email or phone to check on the SNAP application status after 45-60 days.	NO message communication between the patient and staff. Clinical providers may only get a status of referral completed or not during the next patient clinical visit.	Patient can share the status of their application with the food bank and clinical providers through FHIRed-SHIP and can be re-engaged if the application needs to be corrected.

FHIRed-SHIP Pilot

Supplemental Nutrition Assistance Program (SNAP) application coordination



Accomplishments

- Identified major gaps and delays in food referral coordination/workflows.
- Validated SDOH CC FHIR IG dataset.
- Helped to refine Gravity Standards based on real-world pilot.
- Identified major misalignments between Gravity and local need assessments.
- Insights into how tech can help with efficiently using limited staff capacity is a big barrier to sustained, wide-reaching community impact.
- Community Advisory Groups, clinical staff collaboration, food bank coordination.
- Dissemination through presentations, publications, media.

Lessons Learned

- Truly closed-loop referral management will require individual case-by-case workflow analysis and technical development.
- Electronic systems that can support social services referrals are even less prepared to adopt standards than we expected before we started the project.
- Harmonization of needs assessment will be more difficult than we expected, and it will be a large national problem if a strategy is not devised.

Harmonization of Needs Assessments

One of our assessments contain 36 SDOH-related questions. We aimed to match each of them with a corresponding standard from the Gravity Project.

We found 13 perfect matches (36%), 4 partial matches (11%, i.e there is some alignment to the standards, but the question is not an exact match), and 19 mismatch (53%) pairings between the national database questions and local questionnaire questions.

Think about your utilities (gas, water, electric). In the past year...				
I've had trouble paying the bill.	"Do you have trouble paying for your gas or electricity bills?" and selecting "yes"	Health Leads Optional Survey "Add-ons" under Utility Needs (no 12)	Row 108 Material Hardship	perfect match
I got threats or shut my utilities off.	"In the past 12 months has the electric, gas, oil, or water company threatened to shut off services in your home?" with response of "Yes" (Row 9)	CMS AHC Question 8 Under Utility	Material Hardship Row 9	perfect match
My utilities got shut off.	"In the past 12 months has the electric, gas, oil, or water company threatened to shut off services in your home?" with response "Already shut off" (Row 11).	CMS AHC Question 8 Under Utility	Material Hardship Row 11	perfect match
I don't have problems with my utilities.	"Do you have trouble paying for your gas or electricity bills?" and selecting "no"	CMS AHC Question 8 Under Utility	Row 108 Material Hardship	perfect match
Think about your groceries. In the past year, have you worried that you would run out of food?				
yes	"Within the past 12 months, the food you bought just didn't last and you didn't have money to get more" with a response of "Often True"	CMS AHC Question 3 Under Food Insecurity. But with Modified answer choices.	Food Insecurity Row 12	Partial match
no	"Within the past 12 months, the food you bought just didn't last and you didn't have money to get more" with a response of "Never True"	CMS AHC Question 3 Under Food Insecurity. But with Modified answer choices.	Food Insecurity Row 17	Partial match
We don't have enough food right now	"Do you always have enough food for your family" with response of "No" (Row 131) "If no, would you like help with this" with response of "Yes" (Row 132), and then Row 135, "If yes, do you need food for tonight" and response of "Yes"	Not mentioned under CMS AHC	Food Insecurity Row 131,	Bad Match, you need to combine 3 of the gravity questions/answers to get a semi-correlated answer to the local questionaire question. The full meaning of the combination only asks if you need help for food tonight, versus the local question asking if there is enough good right now in the family, which generalizes past one day like Gravity questions suggest.
Think about your neighborhood. Do you feel unsafe doing any of these things?				
being in your yard on your sidewalk	"Please indicate which of the following describe a problem(s) with your housing situation. You may select none or more than one answer" (Row 35) WITH ANSWER OF "Other (please specify)"		Row 35 Inadequate housing	Patient needs to specify in the box that they feel unsafe doing x
shopping at your grocery store	"Please indicate which of the following describe a problem(s) with your housing situation. You may select none or more than one answer" (Row 35) WITH ANSWER OF "Other (please specify)"		Row 35 Inadequate housing	Patient needs to specify in the box that they feel unsafe doing x
using your local park	"Please indicate which of the following describe a problem(s) with your housing situation. You may select none or more than one answer" (Row 35) WITH ANSWER OF "Other (please specify)"		Row 35 Inadequate housing	Patient needs to specify in the box that they feel unsafe doing x
going to your or your child's school	"Please indicate which of the following describe a problem(s) with your housing situation. You may select none or more than one answer" (Row 35) WITH ANSWER OF "Other (please specify)"		Row 35 Inadequate housing	Patient needs to specify in the box that they feel unsafe doing x
visiting your local library	"Please indicate which of the following describe a problem(s) with your housing situation. You may select none or more than one answer" (Row 35) WITH ANSWER OF "Other (please specify)"		Row 35 Inadequate housing	Patient needs to specify in the box that they feel unsafe doing x
waiting at your local bus stop	"Please indicate which of the following describe a problem(s) with your housing situation. You may select none or more than one answer" (Row 35) WITH ANSWER OF "Other (please specify)"		Row 35 Inadequate housing	Patient needs to specify in the box that they feel unsafe doing x
calling the police	"Please indicate which of the following describe a problem(s) with your housing situation. You may select none or more than one answer" (Row 35) WITH ANSWER OF "Other (please specify)"		Row 35 Inadequate housing	Patient needs to specify in the box that they feel unsafe doing x
I feel safe doing all of these things.				

References

- FHIRed-SHIP: An approach to Health Equity by Design for 21st Century Healthcare, https://www.healthit.gov/buzz-blog/health-it/fhired-ship-an-approach-to-health-equity-by-design-for-21st-century-healthcare
- Methods for development and application of data standards in an ontology-driven information model for measuring, managing, and computing social determinants of health for individuals, households, and communities evaluated through an example of asthma. https://www.sciencedirect.com/science/article/abs/pii/S1532046422002465?via%3Dihub
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Aug 2021 – Aug 2023

Principal Investigator:
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Discussion