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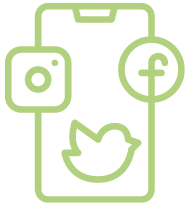

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Food Prescription Programs: The Houston Food Bank Experience and Outcomes

A Multidimensional Evaluation of the
Houston Food Bank Food Rx Program

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UTHealth® Houston

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What is Food Rx

- The global epidemic of diet-related chronic diseases has led to increased understanding of the importance of adequate and healthy food as a mode of both prevention and treatment. Research has shown that people who are food insecure lack access to healthy food and are especially prone to chronic disease

- 'Food as Medicine' or Food Rx programs, increasingly popular in the US, are one way to intervene in this at-risk population.
  - Food Rx programs vary in intensity, from home-delivered "medically tailored meals" to home delivery of produce baskets, to vouchers that can be redeemed at select locations or grocery retail stores
    - Strong evidence that medically tailored meals are effective in reducing health care costs, hospital admissions and length of inpatient stays
    - Heterogeneity and small size of other forms of Food Rx programs and small size makes evaluation difficult

- Increasing interest in institutionalizing these programs, scaling, and considerations for value-based care reimbursement.

Research Purpose

- The purpose of our study was to conduct a comprehensive evaluation of the functioning, outcomes, and cost-effectiveness of a prescription voucher-based Food Rx program implemented at scale by the Houston Food Bank (HFB).

1. Examine clinical (cardio-metabolic) outcomes among patients who utilized the program as compared to those who did not.
    - Conduct a cost-effectiveness analysis to estimate the incremental costs and gains (quality adjusted life years (QALYs)) with HFB's Food Rx implementation over standard medical care.
2. Assess and identify gaps in the patient, information and data flow through the multiple institutions involved in HFB implementation.
3. Understand perceptions and experiences of the HFB program from patients, healthcare partner staff, and food pantry staff.

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HFB Food Rx Program

How does it work?

Screened by Healthcare Partner/ Stay in Community Health Program

Get **Food**Rx card

Get groceries from Food for Change Market

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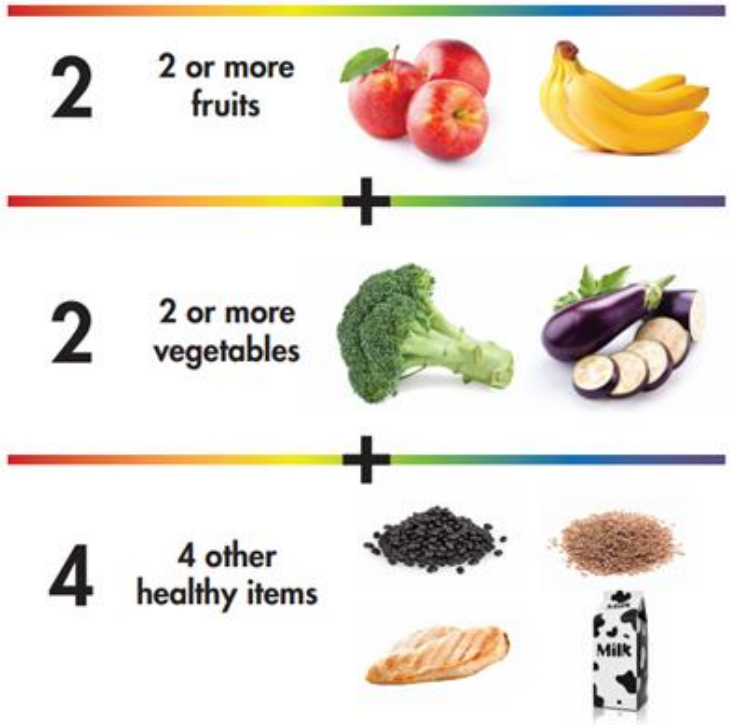
HFB Food Rx Program

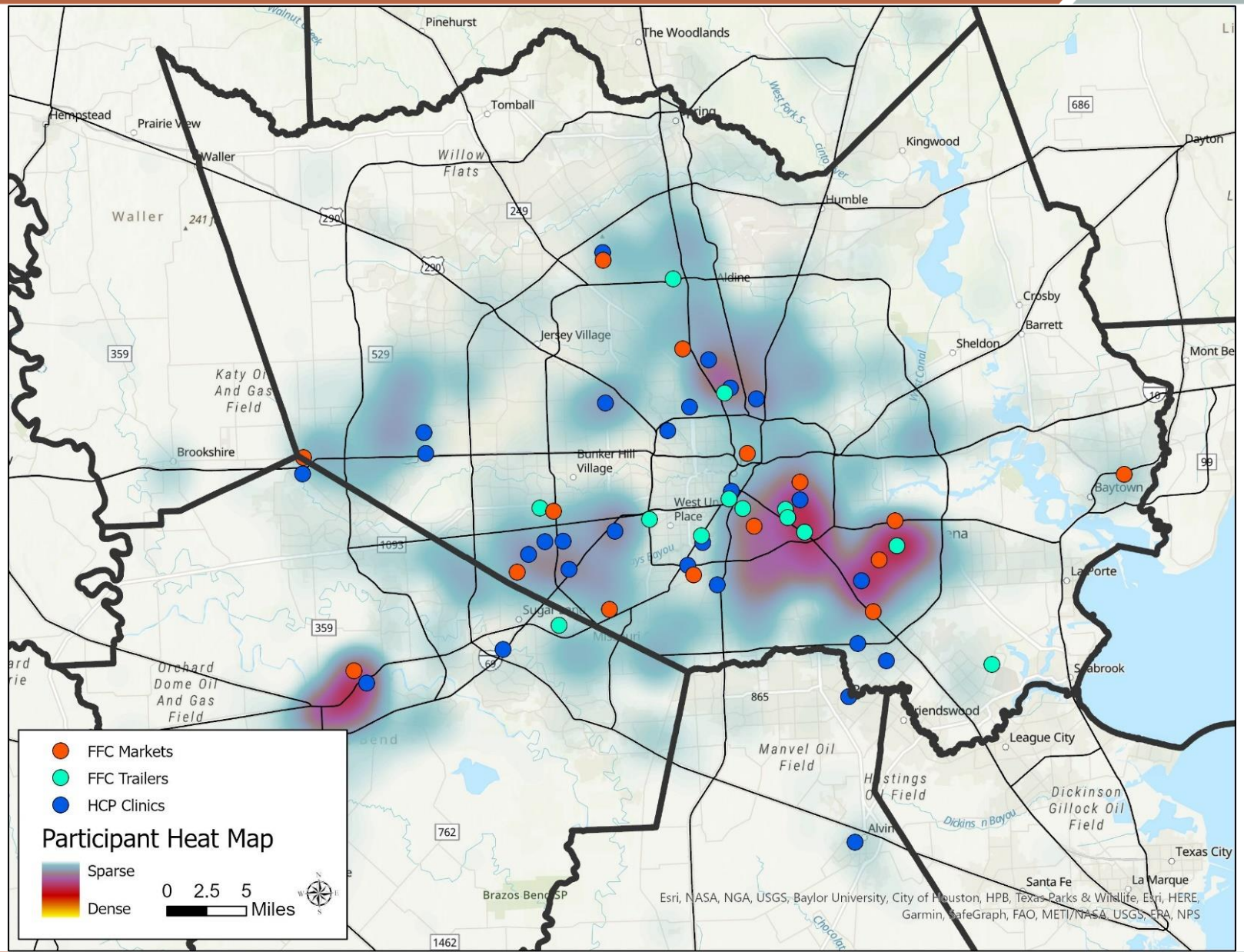
- **Amount:** Up to 30 lbs of produce + 4 healthy items
- **Frequency:** Twice a month
- **Client choice model** at FFC Markets (pantry)



Characteristics of Food Rx Users

Participant Characteristic		Total (n=3093)
		(mean/sd)
Age	Years	49.6 (14.8)
		(%)
Gender	Female	76.3%
Marital status	Married	41.1%
Language spoken	Spanish	54.2%
Race/ethnicity	Hispanic/Latino	69.7%
Education	< High school	50.9%

Food Rx Program Map



Data: 5.2018 to 3.2021

13 food market trailers
15 food markets/pantries
21 healthcare partners

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Results of evaluation

1) Clinical effectiveness analysis
2) Systems and processes study
3) Program perceptions

1) Clinical effectiveness analysis

Impact Analysis

- Outcomes Data: Healthcare providers provided baseline and multiple waves of follow-up outcomes data from patients that were enrolled in HCPs
  - Eligibility criteria for enrollment: food insecure and HbA1c>6.0
  - Outcomes measures: one or more of HbA1c, BMI, SBP, DBP, LDL
  - Only 1st and 2nd measures (6 month follow up) included in analysis; only complete cases included

- Exposure definition: Exposed patients were those that made at least one visit to a food pantry or food bank between the 1st and 2nd outcome measures. Control patients were enrolled patients that did not visit any food bank or pantry between 1st and 2nd outcome measures, and received standard medical care

- Mixed-effects regression models explored the amount of decline and odds of a clinically significant decline, as a function of exposure, for each outcome

Results

- From May 2018 to March 2021, 16 of 21 (76%) healthcare partners provided usable biometric measures for 2,028 patients.
- About half of the enrolled patients (n=1,072, 53%) redeemed a voucher at least once during this period.
  - A total of 956 patients (47%) did not redeem their vouchers at all.
- Eighty five percent of participants visited a pantry 12 or fewer times between clinic visits, and 10% visited a pantry more than 18 times.
  - Average number of visits was 7

Baseline Levels of Outcome Measures

Measure	N at Baseline	Control	Exposed	P for Difference
HbA1c	1,385	8.2	8.5	**0.02**
BMI	1,613	33.4	34.6	ns
LDL	291	89	88	ns
Systolic BP	963	130	134	**0.01**
Diastolic BP	963	77	78	ns

Main Outcomes

Pre-Post Differences					
Measure	**N**	**Control**	**Exposed**	**Net Difference**	**p for Difference**
HbA1c	746	-0.24	-0.52	**-0.28**	**0.007**
BMI	857	0.25	0.11	-0.13	0.653
LDL	216	-4.3	-5.4	-1.2	0.606
Systolic BP	508	1.4	-1.8	**-3.2**	**<0.001**
Diastolic BP	507	1.6	-0.95	**-2.5**	**0.028**

Statistically significant decreases in HbA1c, systolic BP and diastolic BP among those who participated in the Food Rx program, as compared to those who were enrolled but did not participate.

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Intensity Matters

Change in Outcome by Exposure		
Measure	**Change in Outcome by Intensity of Exposure (visits per month)**	**p value**
HbA1c	-0.12 (0.04)	**0.009**
BMI	0.11 (0.11)	0.397
LDL	1.80 (0.70)	**0.018**
Systolic BP	-1.45 (0.60)	**0.016**
Diastolic BP	-0.43 (0.47)	0.356

The results for the intensity measure (number of pantry visits per month) show that every additional visit per month is associated with significant improvements in levels of HbA1c, systolic blood pressure, and significant negative impacts on LDL levels.

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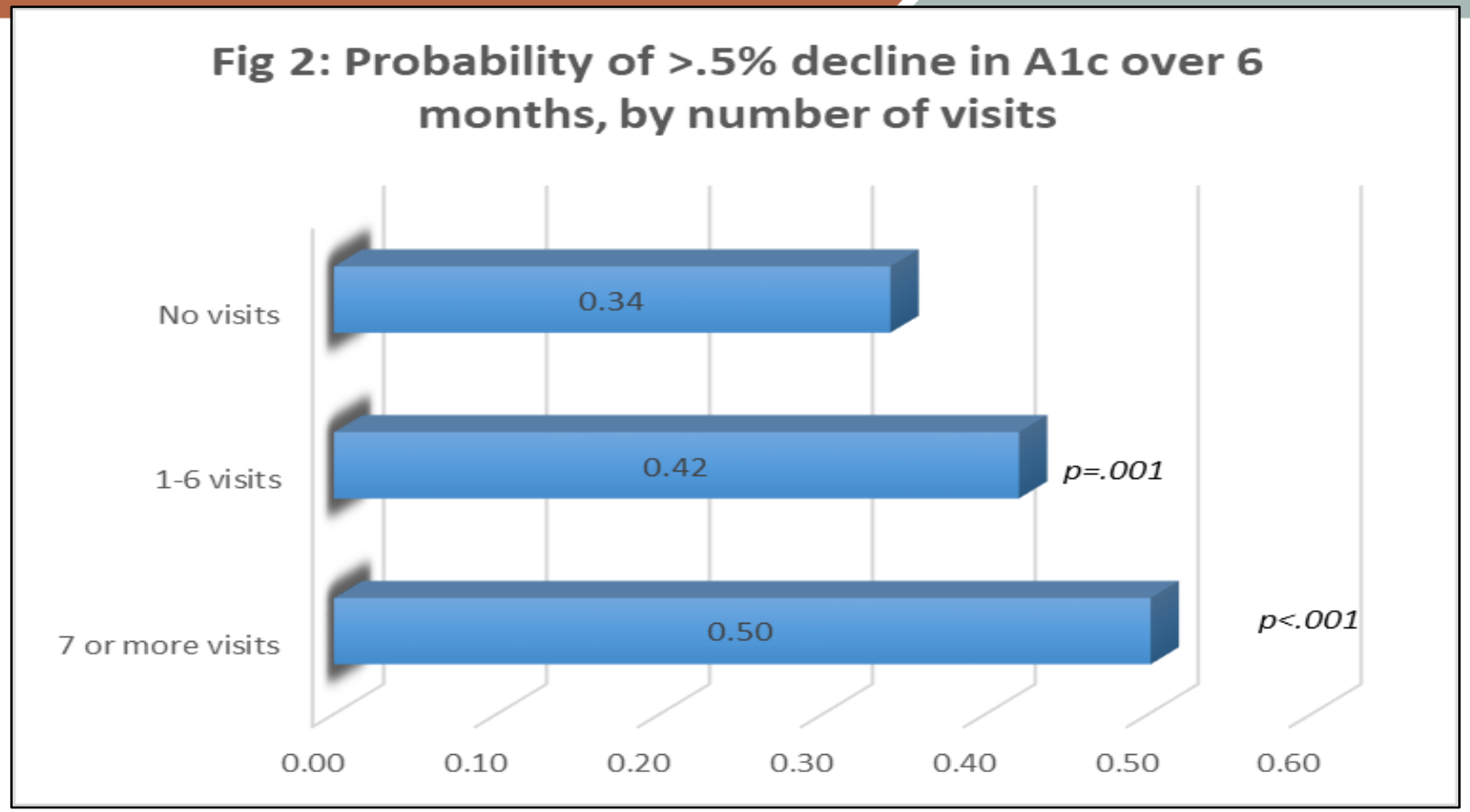
Dose-response effect



A clear dose response effect of the number of pantry visits on the probability of a clinically significant decline in HbA1c. At the highest level of 'dosage', half of exposed patients experienced a clinically significant decline in HbA1c.

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Contextualizing these estimates

- First study to report dose-response effects, and percent showing clinically meaningful improvements in HbA1c
- Estimates are in line with what has been found in other studies
  - A recent meta-analysis across 14 studies found a 0.8% decline in HbA1c levels among users of Food Rx, across different types of Food Rx programs
  - In a 3-state study using food banks, where prepacked boxes of diabetes-appropriate foods were distributed once or twice monthly through food pantries to 687 enrolled clients with diabetes across three states over six months, there was a -0.48 percent points over 6 months among participants with elevated HbA1c at baseline.
- Our study had an approximate control group, allowing us to estimate HbA1c change in a population undergoing usual and customary treatment
- Although data availability limited how far we could take this analysis, better quality data can be easily obtained by relatively minor adjustments to the design of data flow and methods of data collection in this project

Where next?

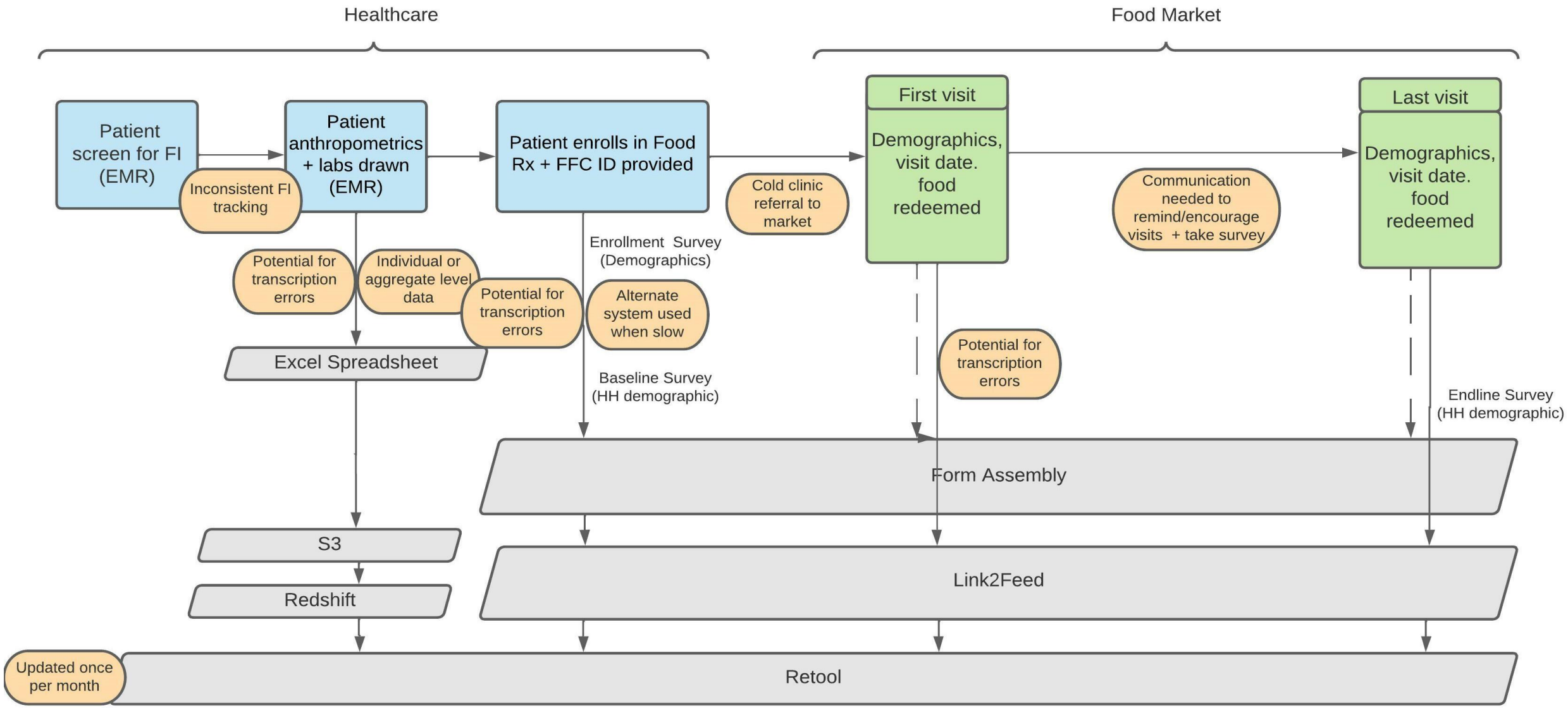
Clinical effectiveness analysis confirms some clinical benefit for Food Rx, in line with other evaluations, but raises other questions

- Is Food Rx cost-effective?
  - Preliminary analysis shows that each additional QALY gained with Food Rsx costs about $1,300. This is highly cost-effective, given that a typical willingness-to-pay threshold per QALY is assumed to be $50,000 to $100,000.
- Are there systemic reasons for low utilization?
- Can perspectives of implementers and end-users provide insight into how to improve programming and redemption rates?

Answering these questions requires cost data, an understanding of process and data flow, and insights into the experiences of patients and providers

2) Systems and processes study

Data Processes and Quality

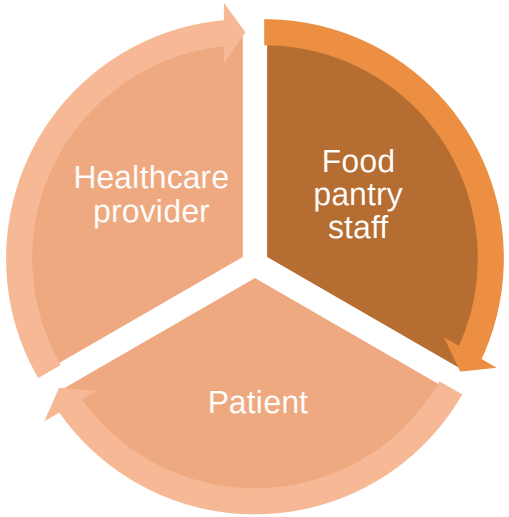


System improvement opportunities

With the systems and processes study, we identified several opportunities for improvement at relatively low cost.

- **A framework-based approach to implementation and evaluation** (E.g. RE-AIM, CFIR).
- **Data quality and usability can be improved** by standardizing information gathering process and content, and by using automated data entry procedures, periodic short online surveys, and by using real time instead of batch processing of visits data
- Facilitating initial use of food markets should be done at the health care provider end, while motivating continued usage of food markets should be done by food bank. **Warm referrals, and ongoing communication channels** across patients, food markets and healthcare partners should be instituted.
- Reminders at pre-specified time points from the healthcare provider to encourage return visit to clinic; possibly accompanied by small incentives

3) Program perceptions



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Patient Interviews

Insights

- **Recognition of healthcare commitment to value based care through food prescription**

“First, it [enrollment in the program] was because we were unemployed. That was the first reason, and also because of bad eating habits, since you can’t always buy vegetables or even fruit.”- Food Rx participant

- **Perceived need for ongoing outreach and communication from HCPs**

- **Recognition of individual patient challenges for program engagement**.

“The only reason [for non-participation] is I don't have no transportation. I guess I do make it to my appointment, but I have a bike. And they offer you a lot of food, and it's very hard to bring it in back to the house in a bike.” – Food Rx participant

- **Need for food pantry adjustments/training** in food quality and nutrition education to provide food prescription redemptions successfully.
  - Additional staff training and increased capacity at the pantry may be warranted.

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Healthcare Perceptions

Themes

- **Salience of value-based care strategy.** There is a desire to continue food prescription programs by clinic staff, and future sustainability efforts should consider reimbursement of programs by health insurance companies

*Food Rx helps with participants to use their new **knowledge about healthy eating** by providing them with fruits and vegetables to go home and eat more healthy. It helps **relieve the monetary burden**, and encourage them to try fruits and vegetables that otherwise they would not be able to buy." – healthcare provider*

- **Patient and food pantry barriers to success.** Ensuring sufficient inventory of fresh produce, maintaining timely restocking practices at pantries, and minimizing patient personal barriers are integral to program success

- **Importance of inter-organization care coordination.** Warm referrals and standardized reminders across clinicians and food pantries is a necessary strategy to help increase food prescription redemption rates

- **Needed workflow integration within HCPs.** Integration into existing workflows and quality metrics should be planned as part of implementation

Food Pantry Staff

Findings

- Only half of responding pantry staff reported providing any food or nutrition education; additionally, they did ***not*** perceive nutrition education to be a salient benefit of the program.

- Pantry staff and volunteers had an overall **low reporting of knowledge of the intended benefits of Food Rx** to clients. Attention to the connection and engagement with healthcare providers was particularly low and a noted area in need of improvement.

- It is evident, too, that **pantry staff need to be better socialized to the objectives of the program, and to recognize that it is not just a food access program**; rather, they need to understand and communicate to patients that healthy food is a health intervention.

- Food pantry staff and volunteers were generally **satisfied with the quantity of food provided in Food Rx, but less so with food variety and quality** which may vary in part due to seasonal fluctuations in produce availability.

- Transportation was identified as a continued barrier to visiting the pantry for the patients.

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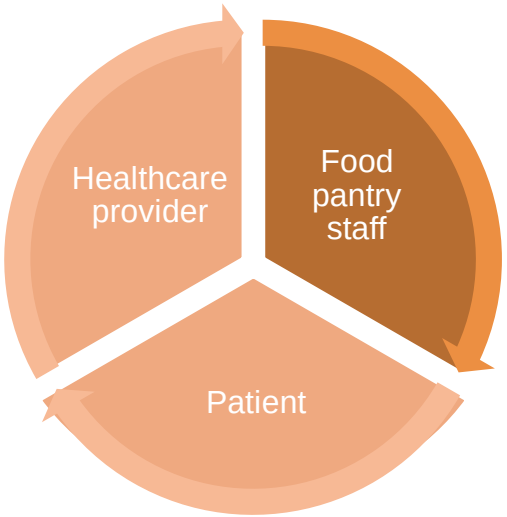
Common themes across all three program participant groups

- Strong support for the Food Rx program across all participant groups, but a less than complete understanding of the purpose of the program and how it relates to health.
    - Tendency to view the program as a food access program, rather than as a health intervention

- 2. A perceived need for warm referral and care coordination protocols to improve redemption and retention of Food Rx participants.

- 3. The recognition of significant co-occurring SDOH needs, such as transportation, that hinder Food Rx redemption.



Bringing Stakeholders to the table

Taking this work forward

- The patient/client is the most critical stakeholder: It is recommended that patient/participant voice be formally institutionalized as part of program design/implementation/evaluation for any Food Rx model.

- Who are the other stakeholder groups that are most vested in taking this work forward? What are their roles?

- We identified five distinct groups of shareholders who need to be at the table to ensure the success of any meaningful institutionalization of Food Rx:
  - Food Rx program implementers, including HFB
  - Advocates and community groups
  - Healthcare payers and providers
  - Researchers
  - Funders and policy makers

Program implementers

- These studies provided actionable insights for HFB and other implementers to incorporate in future HFB programming.
  - Strengthen existing footprint and expand reach of Food Rx redemption sites (markets) to address patient challenges with program engagement (e.g. transportation, hours of operation)
  - Program perceptions: Re-framing Food Rx as a health intervention with tailored nutrition education component
  - Implement Quality of Life measures as part of pre and post surveys to convey broader program value
  - Develop communication channels, including text-messaging systems and automated prompts to keep enrollees engaged in the system

Advocates and Community Groups

Stakeholder Implications

- Institutionalize community perspectives regarding community needs within program planning and implementation,
  - include perceived challenges, how to best mitigate barriers to program implementation, and how to address social disparities.
- Collaborate with other stakeholders on meaningful solutions to support long-term program sustainability through community driven infrastructure and initiatives to support these programs.
- Establish relationships and shared processes across sectors to support all aspects of food prescription programming and evaluation
- Support dissemination of research and findings to wider audiences using attributive science communication techniques, including “common-speak” and sharing the lived experience

Researchers

Stakeholder Implications

- **Clinical research**: Most research examines effects over a 6-month period. Further research is needed to examine what is a sufficient dose, and whether there is decay of effects
- Emphasis on **implementation framework and outcomes**, including factors affecting program participation, and alternative models of food provision
- Focus on **building academic partnerships** with community organizations that are involved in Food Rx program to design common metrics, implementation/evaluation framework and mapping.
- Develop and implement less burdensome **measurement methods** for potential mediators, such as consumption of healthy foods, spending trade offs, and other outcomes such as averted healthcare costs

Healthcare Payers and Providers

Stakeholder Implications

- For optimal functioning, several system-wide changes will have to be instituted
  - Socialize all agents to the value of the program
  - Integrate screening and program activities into workflow and quality metrics
  - Establish communication and feedback channels to motivate redemption and keep patients engaged
  - Make food more accessible, e.g., by including retail partners in the distribution chain, co-locating pantries within clinics, mobile markets etc.

"Well, I mean, I guess probably whenever people visit the clinic, maybe another friendly reminder there. Maybe a flyer. That's a different way of letting people know that, "You know what? You still have your pickups." **– patient who was eligible and enrolled in Food Rx but did not redeem their voucher**

Funders and Policy Makers

Stakeholder Implications

- **Food Rx work should be guided by evidence-based implementation/evaluation frameworks and data infrastructure support is** needed for healthcare systems and social service agencies like the food bank to implement smoothly and assess them with sufficient rigor for impact on health, economic and social outcomes.
    - Funders should require the partnership of academic or other non-profit research-focused agencies to build the data backbone and infrastructure necessary for ongoing monitoring and evaluation

- Policymakers and funders **foundational care coordination infrastructure support:** Facilitating information exchange ecosystem for care coordination between healthcare and social service agencies (e.g. closed loop referrals) with feedback loops to mitigate barriers to participation in real-time.

- Policymakers and funders should also look into supporting research to investigate mitigating low redemption rates**,** and low return rates of patients to healthcare providers, using strategies such as making food more accessible.

- There is mounting evidence nationwide on the effectiveness of food prescription programs on behavioral, social, health and economic outcomes. **We are building out the regional evidence to inform this work**. Legislative action is needed to establish MCO-social service agency partnerships needed to provide food prescriptions to Medicare/Medicaid beneficiaries who are food insecure with chronic disease.
    - MCO-payer Think Tank launch through the Health Equity Collective

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Webinar recording at https://sph.uth.edu/research/centers/dell/
Final report, Implementation toolkit and publications are forthcoming, and will be posted to this site as they become available

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